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Dominion®

April 28, 2009

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Serial No.	09-187
NSSL/MLC	R0
Docket No.	50-423
License No.	NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM
AND ASSOCIATED PROPOSED ALTERNATIVES AND RELIEF REQUESTS

Pursuant to 10 CFR 50.55a(g)(4), Dominion Nuclear Connecticut, Inc. (DNC) submits the Millstone Power Station Unit 3 (MPS3) inservice inspection (ISI) program for the third 10-year interval applicable to Class 1, 2, and 3 components and component supports. The ISI program, included as Attachment 1 to this letter, describes the programmatic aspects of ISI examination of components and component supports. The attached ISI program does not address the piping examination requirements that will result from implementation of risk-informed technology. DNC is presently developing a risk-informed program for the examination of piping that will be applicable to Class 1 piping, as a minimum. Upon development of the risk-informed program and required supporting documents, a supplemental submittal to the Third 10-Year Interval ISI Program will be provided. This supplemental submittal will address the risk-informed scope and modifications to the examination requirements of affected piping components. The delayed submittal of the risk-informed portion of the ASME Section XI program for MPS3 was discussed via teleconference with the NRC on May 8, 2008 and agreed upon in a May 13, 2008 teleconference with Mr. Siva Lingam.

The ISI program has been developed in accordance with the requirements of the 2004 Edition, with no addenda, of Section XI of the ASME Boiler and Pressure Vessel Code. MPS3 will also comply with the limitations and modifications to these requirements stated in 10 CFR 50.55a(b) related to the implementation of the 2004 ASME Code. The third 10-year ISI interval began on April 23, 2009 and MPS3 implemented the program on that date.

Pursuant to 10 CFR 50.55a (a)(3)(i) and/or (ii) and 10 CFR 50.55a(g)(5)(iv), DNC is also requesting the use of alternative examination or testing requirements in place of and/or requesting relief from certain examination or testing requirements of the 2004 ASME Code. The proposed alternatives or relief requests from specific 2004 code requirements are provided in Attachment 2. Prior NRC approval is required before the relief requests can be implemented. The MPS3 Third 10-year Interval ISI Plan and associated requests for the use of alternative or relief from specific 2004 ASME Code requirements have been reviewed and approved by the station's Facility Safety Review Committee.

DNC requests review and approval of relief request IR-3-01 by April 1, 2010 in order to utilize the relief request in the first outage (3R13) of the third 10-year interval if needed.

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Forecasting anticipated needs based on operating experience, DNC requests review and approval of relief request IR-3-04 by August 31, 2009.

DNC requests review and approval of the remaining relief requests by June 1, 2010. The remaining portions of the ISI program are within the provisions of the ASME Boiler And Pressure Vessel Code and require no NRC approval for implementation.

If you have any questions or require additional information, please contact Wanda Craft at (804) 273-4687.

Sincerely,

J. Alan Price
Vice President – Nuclear Engineering

Attachments:

1. MPS3 Third 10-Year Interval Inservice Inspection (ISI) Plan
2. MPS3 Third 10-Year Interval Inservice Inspection (ISI) Relief Requests

Commitments made in this letter:

1. None

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ATTACHMENT 1

MILLSTONE POWER STATION UNIT 3
THIRD 10-YEAR INTERVAL INSERVICE INSPECTION (ISI) PLAN

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

MILLSTONE UNIT 3
INSERVICE INSPECTION PROGRAM MANUAL
REVISION 2

THIRD TEN-YEAR INTERVAL

DOMINION NUCLEAR CONNECTICUT

MILLSTONE POWER STATION UNIT 3
INSERVICE INSPECTION PROGRAM
THIRD TEN-YEAR INTERVAL

ABSTRACT

This document describes the third Ten-Year Inservice Inspection Program for Millstone Power Station Unit 3 (MPS3). This summary addresses the requirements of the ASME Boiler and Pressure Vessel (B&PV) Code, Section XI, Division 1, 2004 Edition. Additional requirements for augmented inspections are also addressed.

Included are relief requests and tables identifying the components subject to examination by Code Examination Category and Code Item Number.

Pursuant to 10 CFR 50.55a(g)4(ii) Dominion Nuclear Connecticut (DNC) is required, as a minimum, to develop this program to the 2001 Edition, through the 2003 Addenda of ASME Section XI. However, as allowed by 10 CFR 50.55a(g)(4)(iv), the third inspection interval was prepared to the requirements of the 2004 Edition of ASME Section XI with no Addenda.

An alternative to the ASME Section XI requirements for the Inservice Inspection of Class 1 piping, Category B-J and B-F was implemented during the second interval based on the Risk Informed technology developed in accordance with the Westinghouse Owners Group Topical Report "WCAP 14572, Revision 1-NP-A". The request to use this alternative was submitted to the Nuclear Regulatory Commission on July 25, 2000 with approval received on March 12, 2002.

The ISI Program does not currently address the piping examination requirements that will result from the implementation of risk-informed technology for the third inspection interval. DNC is presently updating the risk-informed program for the examination of piping that will be applicable to Class 1 piping, as a minimum. Upon the completion of the update of the risk-informed program, and required supporting documents, a supplemental submittal to the third interval ISI Program will be provided. This supplemental submittal will address the risk-informed scope and modifications to the examination requirements of affected piping components.

TABLE OF CONTENTS

1. INTRODUCTION

1.1 General

1.1.1 This manual describes the MPS3 third Ten-Year Inservice Inspection Plan.

The inspection plan, which consists of ASME Class 1, Class 2, and Class 3 systems and components (and their supports) has been developed utilizing applicable portions of the following documents:

- 10 CFR 50.2, Definitions
- 10 CFR 50.55a, Codes and Standards
- ASME Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 2004 Edition
- ASME Section III, Rules for Construction of Nuclear Power Plants, 1971 Edition with the Summer 1973 Addenda up to and including the 2004 Edition
- USNRC Standard Review Plan (SRP 6.6, Section II-7)
- USNRC Regulatory Guides:

  1. RG 1.26, Rev. 3, February 1976
  2. RG 1.65, Rev. 0, October 1973
  3. RG 1.83, Rev. 1, July 1975
  4. RG 1.84 Rev. 34, October 2007
  5. RG 1.147, Rev. 15, October 2007
  6. RG 1.150, Rev. 1, February 1983
  7. RG 1.193, Rev 2, October 2007

- MPS3 FSAR
- MPS3 Technical Specifications
- WCAP 14572, Revision 1-NP-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report".

- ASME Code Cases:

1. N-432-1
2. N-460
3. N-504-3
4. N-513-2
5. N-526
6. N-532-4
7. N-537
8. N-545
9. N-552
10. N-566-2
11. N-586-1
12. N-600
13. N-613-1
14. N-624
15. N-638-1
16. N-639
17. N-648-1
18. N-651
19. N-658
20. N-661
21. N-663
22. N-683
23. N-686
24. N-695
25. N-696
26. N-722
27. N-729-1
28. N-731
29. N-770

Note: Code Case details may be found in Section 3.

1.1.2 The programs listed below are addressed in separate program documents:

- Inservice Testing of Pumps and Valves
- Class MC and Class CC Components (Containment Inservice Inspection Program)
- Examination of Steam Generator Tubing
- Snubber Examination and Testing

1.1.3 Administrative implementing procedures utilized in implementation of the ISI program are listed below:

- MP-24-ISI-FAP01, Inservice Inspection Unresolved Indication Reporting
- MP-24-ISI-FAP02.3, ASME Section XI Pressure Tests Program for Unit 3
- EN 31090, Elevated Pressure Test
- SP 3601F.7, Reactor Coolant System Leak Test
- SP 31129, Inservice Inspection Implementation
- CEN 101C, Management of ASME Section XI Inservice Inspection Program
- ER-AA-RRM-100, ASME Section XI Repair/Replacement Program Fleet Implementation Requirements
- ER-AA-ISI-10, ASME Section XI Inservice Inspection Program
- ER-AA-ISI-100, DNC Inservice Inspection Program
- ER-AA-ISI-101, DNC Inservice Inspection Program Preparation and Change Control Process
- ER-AA-SPT-10, ASME Section XI System Pressure Test Program
- ER-AA-SPT-100, ASME Section XI System Pressure Test Program Fleet Implementation Requirements
- ER-AA-ISI-RI-10, ASME Section XI Risk Informed Inservice Inspection Program
- ER-AA-ISI-RI-100, DNC Risk Informed Program

1.2 Applicable Editions and Addenda to Section XI

1.2.1 Pursuant to Title 10 of the Code of Federal Regulations, Part 50, Paragraph 50.55a (10 CFR 50.55a), Final Rules dated September 10, 2008 and October 2, 2008, the inspection requirements applicable to nondestructive examination are based on the rules set forth in the 2004 Edition of ASME Section XI, hereinafter referred to as ASME Section XI.

1.2.2 Pursuant to Title 10 of the Code of Federal Regulations, Part 50, Paragraph 50.55a (10 CFR 50.55a), Final Rules dated September 10, 2008 and October 2, 2008, the implementation of ASME Section XI, Appendix VIII "Performance Demonstration for Ultrasonic Examination Systems" is based on the 2001 Edition of ASME Section XI.

1.2.3 As permitted by paragraph 50.55a(g)(4)(iv), DNC may elect to meet the requirements set forth in editions and addenda of ASME Section XI which become effective subsequent to the 2004 Edition of ASME Section XI. NRC approval is required prior to implementing these later editions or addenda (Reference NRC Regulatory Issue Summary RIS-2004-12). Editions and Addenda of ASME Section XI or ASME Code Cases that are adopted will be identified in the appropriate sections of this inspection program. It is the intent of DNC to apply appropriate revisions of ASME Section XI, with NRC approval, which improve the overall quality of MPS3's inspection program. Those changes that are applied will be identified in this Section of the ISI Program.

1.3 <u>Historical ISI Program Information</u>

1.3.1 The base code of record for the preservice inspection was the 1980 Edition through Winter 1980 Addenda of ASME Section XI.

1.3.2 The base code of record for the first Ten-Year ISI inspection interval was the 1983 Edition through Summer 1983 Addenda of ASME Section XI, except for Class 2 piping welds which were updated to the 1983 Edition through Winter 1985 Addenda.

1.3.3 The first 10-Year Inspection Interval began on April 23, 1986 and ended on October 23, 1999. The interval was extended by 18 months based on the unit being out of service continuously greater than 6 months as allowed by IWA-2430(e) and extended an additional 1 year as allowed by IWA-2430(d). Ref. NRC correspondence letter B16015 dated November 20, 1996 and letter B17355 dated July 14, 1998.

1.3.4 The second 10-Year Inspection Interval began on April 23, 1999 (overlapping with the end of the first interval) and is scheduled to end on April 22, 2009. The interval was adjusted by six months per NRC Letter S/N 07-0340, dated May 03, 2007. The Code of record was the 1989 Edition of ASME Section XI.

1.4 System Classification

1.4.1 The construction permit for MPS3 was issued in August 1974. The operating license was issued in January 1986. Northeast Nuclear Energy Company was the owner of record, and Stone & Webster was the Architect Engineer and installer of record.

1.4.2 The system classifications for the Inservice Inspection Plan are based on the requirements of 10 CFR 50 and Regulatory Guide 1.26.

1.4.3 Class 1 system boundaries were developed based on the 10 CFR 50.2, Reactor Coolant Pressure Boundary definition.

1.4.4 Class 2 and Class 3 system boundaries were developed based on Regulatory Guide 1.26.

1.4.5 System boundary diagrams are listed below and depict the specific boundaries for the Class 1, Class 2, and Class 3 systems. These are controlled documents in accordance with site procedures.

Applicable Class	Drawing Number
Class 1 Boundaries	25212-20997
Class 2 Boundaries	25212-20998 Sht. 1 & 2
Class 3 Boundaries	25212-20999 Sht. 1, 2, & 3

System pressure test boundaries are described in Section 5.

1.5 Inspection Program

1.5.1 Schedule

Examinations for the third ten-year interval are scheduled in accordance with Inspection Program B, as described in IWA-2400 of ASME Section XI, for the Class 1, Class 2, and Class 3 systems, components, and supports. Where the original schedule conflicts with other activities during the refueling outage, examinations may be rescheduled as long as the requirements of IWX-2412 are met.

The sequence of examinations established for this inspection interval have been scheduled as close as practical to that of the previous inspection intervals. The duration between examinations of the second interval and the third interval may exceed 10 years due to the extended down time of the unit and interval extensions allowed by IWA-2430.

The Third Inspection Interval will begin on April 23, 2009 and will end April 22, 2019.
The refueling outage schedule and corresponding inspection periods are listed below:

Refueling Outage	Year Scheduled	Inspection Period
3R13	Spring 2010	1
3R14	Fall 2011	1
3R15	Spring 2013	2
3R16	Fall 2014	2
3R17	Spring 2016	3
3R18	Fall 2017	3
3R19	Spring 2019	3

Examination Period Dates

First Period - April 23, 2009 to April 22, 2012

Second Period - April 23, 2012 to August 22, 2015

Third Period - August 23, 2015 to April 22, 2019

DNC may increase or decrease the inspection interval by as much as one year as allowed by ASME Section XI, Article IWA-2400. IWA-2430(d)(2) allows performance of examinations in overlapping intervals, as long as code credit for the given exam is taken for only one of the intervals.

DNC may increase or decrease the inspection period by as much as 1 year to enable an inspection to coincide within a plant outage as allowed by ASME Section XI, IWA-2430(d)(1).

1.5.2 Additional Examinations
[Commitment Table 8.1, File B16368]

NOTE: If in the expansion to perform additional examinations it is found that ASME Section XI requirements cannot be met in the performance of these exams, then relief shall be sought as specified in 3.1 of this Program Manual.

A. Class 1

Additional examinations for Class 1 equivalent components (IWB) shall be in accordance with the requirements of IWB-2430 or the alternative requirements of Code Case N-586-1 in lieu of those in IWB-2430(a). The additional examination samples are defined as those items (welds, areas, or parts) in a particular examination category and item number. The initial sample is the sample scheduled for examination at a particular outage for ASME Section XI credit.

(1) Examinations performed in accordance with Table IWB-2500-1, except for Examination Category B-P, that reveal flaws or relevant conditions exceeding the acceptance standards of Table IWB-3410-1 shall be extended to include additional examinations during the current outage. The additional examinations shall include an additional number of welds, areas, or parts included in the inspection item equal to the number of welds, areas, or parts included in the inspection item that were scheduled to be performed during the present inspection period. The additional examinations shall be selected from welds, areas, or parts of similar material and service. This additional selection may require inclusion of piping systems other than the one containing the flaws or relevant conditions.

(2) If the additional examinations required by IWB-2430(a) reveal flaws or relevant conditions exceeding the acceptance standards of Table IWB-3410-1, the examinations shall be further extended to include additional examinations during the current outage. These additional examinations shall include the remaining number of welds, areas, or parts of similar material and service subject to the same type of flaws or relevant conditions.

(3) For the inspection period following the period in which the examinations of IWB-2430(a) or (b) were completed, the examinations shall be performed as originally scheduled in accordance with IWB-2400.

(4) For steam generator tubing, additional examinations shall be governed by plant Technical Specifications.

(5) If welded attachments are examined as a result of identified component support deformation, and the results of these examinations exceed the acceptance standards of Table IWB-3410-1, additional examinations shall be performed, if determined necessary, based on an evaluation by DNC.

An alternative to the requirements of IWB-2430 was previously implemented during the second inspection interval for Class 1 Risk Informed piping (Category R-A) examinations as submitted in Relief Request 1-RI-ISI-01 dated July 25, 2000. The Class 1 Risk Informed program is presently being updated for the third inspection interval and will be submitted following completion. This submittal includes a request to continue to use the following alternative to IWB-2430;

(1) An engineering evaluation shall be performed to determine the root cause of any unacceptable flaw or relevant condition found during examination. The evaluation will include the applicable service conditions and degradation mechanisms to determine whether other elements on the segment or segments are subject to the same root cause and degradation mechanism.

    Additional examinations will be performed on these elements up to a number equivalent to the number of elements required to be inspected on the segment or segments.

(2) If unacceptable flaws or relevant conditions are again found in the additional examinations similar to the initial condition, the remaining elements identified as susceptible will be examined.

(3) No additional examinations will be performed if there are no additional elements identified as being susceptible to the same service related root cause conditions or degradation mechanisms.

B. Class 2

Additional examinations for Class 2 equivalent components (IWC) shall be selected in accordance with IWC-2430 or the alternative requirements of Code Case N-586-1 in lieu of those in IWC-2430(a). The additional examination samples are defined as those items (welds, areas, or parts) in a particular examination category. The initial sample is the sample scheduled for examination at a particular outage for ASME Section XI credit.

(1) Examinations performed in accordance with Table IWC-2500-1, except for Examination Category C-H, that reveal flaws or relevant conditions exceeding the acceptance standards of Table IWC-3410-1 shall be extended to include additional examinations during the current outage. The additional examinations shall include an additional number of welds, areas, or parts included in the inspection item equal to 20% of the number of welds, areas, or parts included in the inspection item that are scheduled to be performed during the interval. The additional examinations shall be selected from welds, areas, or parts of similar material and service. This additional selection may require inclusion of piping systems other than the one containing the flaws or relevant conditions.

(2) If the additional examinations required by IWC-2430(a) reveal flaws or relevant conditions exceeding the acceptance standards of Table IWC-3410-1, the examinations shall be further extended to include additional examinations during the current outage. These additional examinations shall include the remaining number of welds, areas, or parts of similar material and service subject to the same type of flaws or relevant conditions.

(3) For the inspection period following the period in which the examinations of IWC-2430(a) or (b) were completed, the examinations shall be performed as originally scheduled in accordance with IWC-2400.

(4) If welded attachments are examined as a result of identified component support deformation, and the results of these examinations exceed the acceptance standards of Table IWC-3410-1, additional examinations shall be performed, if determined necessary, based on an evaluation by DNC.

C. Class 3

Additional examinations for Class 3 equivalent components (IWD) shall be selected in accordance with IWD-2430 or the alternative requirements of Code Case N-586-1 in lieu of those in IWD-2430(a). The additional examination samples are defined as those items (welds, areas, or parts) in a particular examination category. The initial sample is the sample scheduled for examination at a particular outage for ASME Section XI credit.

(1) Examinations performed in accordance with Table IWD-2500-1, except for Examination Category D-B, that reveal flaws or relevant conditions exceeding the acceptance standards of IWD-3000 shall be extended to include additional examinations during the current outage. The additional examinations shall include an additional number of welds, areas, or parts included in the inspection item equal to 20% of the number of welds, areas, or parts included in the inspection item that are scheduled to be performed during the interval. The additional examinations shall be selected from welds, areas, or parts of similar material and service. This additional selection may require inclusion of piping systems other than the one containing the flaws or relevant conditions.

(2) If the additional examinations required by IWD-2430(a) reveal flaws or relevant conditions exceeding the acceptance standards of IWD-3000, the examinations shall be further extended to include additional examinations during the current outage. The extent of the additional examinations shall be determined by DNC based upon an engineering evaluation of the root cause of the flaws or relevant conditions. DNC's corrective actions shall be documented in accordance with IWA-6000.

(3) For the inspection period following the period in which the examinations of IWD-2430(a) or (b) were completed, the examinations shall be performed as originally scheduled in accordance with IWD-2400.

(4) If welded attachments are examined as a result of identified component support deformation, and the results of these examinations exceed the acceptance standards of

IWD-3000, additional examinations shall be performed, if determined necessary, based on an evaluation by DNC.

D. Component Supports

Additional examinations for Class 1, 2, 3 and MC component supports shall be selected in accordance with IWF-2430 or the alternative requirements of Code Case N-586-1 in lieu of those in IWF-2430(a). The additional examination samples are defined as those component supports in a particular examination category. The initial sample is the sample scheduled for examination at a particular outage for ASME Section XI credit.

NOTE: When an inservice examination of a component support reveals conditions described in ASME Section XI, and the component support has been analyzed and/or tested to substantiate its integrity for its intended service, and has been found to be acceptable and corrective measures have been performed to restore the support to its original condition, then additional support examinations are not required. (Reference ASME Inquiry XI-1-86-30R2.)

(1) Component support examinations performed in accordance with Table IWF-2500-1 that reveal flaws or relevant conditions exceeding the acceptance standards of IWF-3400 shall be extended, during the current outage, to include the component supports immediately adjacent to those component supports for which corrective action is required. The additional examinations shall be extended, during the current outage, to include additional supports within the system, equal in number and of the same type and function as those scheduled for examination during the inspection period.

(2) When the additional examinations required by IWF-2430(a) reveal flaws or relevant conditions exceeding the acceptance standards of IWF-3400, the examinations shall be further extended to include additional examinations during the current outage. These additional examinations shall include the remaining component supports within the system of the same type and function.

(3) When the additional examinations required by IWF-2430(b) reveal flaws or relevant conditions exceeding the acceptance standards of IWF-3400, the examinations shall

be extended, during the current outage, to include all nonexempt supports potentially subject to the same failure modes that required corrective actions in accordance with IWF-2430(a) and (b). Also, these additional examinations shall include nonexempt component supports in other systems when the support failures requiring corrective actions indicate non-system-related support failure modes.

(4) When the additional examinations required by IWF-2430(c) reveal flaws or relevant conditions exceeding the acceptance standards of IWF-3400, DNC shall examine, during the current outage, those exempt component supports that could be affected by the same observed failure modes and could affect nonexempt components.

1.6 Responsibilities

1.6.1 Nuclear Engineering, ISI/Materials Group

The ISI/Materials Group is responsible for the establishment and implementation of the inservice inspection (ISI) program. The following procedures detail the responsibilities related to implementation of the ISI Program:

- ER-AA-ISI-10, ASME Section XI Inservice Inspection Program
- ER-AA-ISI-100, DNC Inservice Inspection Program
- ER-AA-ISI-101, Dominion Inservice Inspection Program Preparation and Change Control Process
- ER-AA-ISI-102, Dominion Inservice Inspection IDDEAL Software Suite
- ER-AA-SPT-10, ASME Section XI System Pressure Test Program
- ER-AA-SPT-100, ASME Section XI System Pressure Test Program Fleet Implementation Requirements
- ER-AA-ISI-RI-10, ASME Section XI Risk Informed Inservice Inspection Program
- ER-AA-ISI-RI-100, DNC Risk Informed Program
- ER-AA-ISI-RI-101, The Dominion Risk Informed Period Update Process

The ISI Program Owner (DNC) retains primary responsibility for implementation of the ISI program.

1.7 Personnel Certification

Personnel shall be qualified and certified to perform nondestructive examination (NDE) in accordance with IWA-2300 and applicable site procedures.

Personnel performing VT-2 examinations shall be certified in accordance with IWA-2300.

1.8 Code of Federal Regulations Modifications, Limitations and Augmented Examination Requirements

The following mandatory and optional Code of Federal Regulations Limitations, Modifications and Augmented Examination Requirements are included in 10 CFR 50.55a as published on September 10, 2008 and amended on October 2, 2008. Only those 10 CFR 50.55a Limitations, Modifications and Augmented Examination Requirements applicable to the 2004 Edition of Section XI nondestructive examination requirements for Class 1, 2, and 3 components and component supports are listed. These Limitations, Modifications and Augmented Examination Requirements were reviewed for inclusion in the ISI Program Manual and dispositioned as follows:

1.8.1 MPS3 will not implement the option in 10 CFR 50.55a(b)(2)(i), to utilize ASME Section XI, 1974 Edition with Addenda through Summer 1975 and ASME Section XI, 1977 Edition with Addenda through Summer 1978.

1.8.2 MPS3 will not utilize the option in 10 CFR 50.55a(b)(2)(ii), to examine Class 1 piping per ASME Section XI, 1974 Edition with the Summer 1975 Addenda.

1.8.3 As allowed by 10 CFR 50.55a(b)(2)(iii), steam generator tubing at MPS3 will be examined in accordance with plant Technical Specification 3/4.4.5 in lieu of Article IWB-2000.

1.8.4 MPS3 will not utilize the option in 10 CFR 50.55a(b)(2)(iv), to examine Class 2 piping per ASME Section XI, 1974 Edition with the Summer 1975 Addenda and the 1983 Edition through the Summer 1983 Addenda.

1.8.5 The MPS3 design includes a concrete containment subject to ASME Section XI, Subsection IWL requirements. Therefore the mandatory modification in 10 CFR 50.55a(b)(2)(viii) applies to MPS3. Subsection IWL requirements and 10 CFR 50.55a requirements are addressed under Containment Inspection Program MP-24-CII-PROG.

1.8.6 The MPS3 design includes a metal containment subject to ASME Section XI, Subsection IWE requirements. Therefore the mandatory modification in 10 CFR 50.55a(b)(2)(ix) applies to MPS3. Subsection IWE requirements and 10CFR50.55a requirements are addressed under Containment Inspection Program MP-24-CII-PROG.

1.8.7 As required by 10 CFR 50.55a(b)(2)(x), MPS3 will apply the station Appendix B Quality Assurance Program of NQA-1 to Section XI activities.

1.8.8 The requirements for performing underwater welding as stated in 10 CFR 50.55a(b)(2)(xii) are not addressed in the MPS3 ISI Program. Repair Replacement activities are addressed in Dominion Fleet Repair Replacement Program ER-AA-RRM-100.

1.8.9 As allowed by 10 CFR 50.55a(b)(2)(xiv), for Appendix VIII Qualified Personnel, MPS3 will use the annual practice requirements in VII-4240 of Section XI Appendix VII in place of the 8 hours of annual hands-on training (when deemed appropriate) as discussed in 10 CFR 50.55a(b)(2)(xiv). When utilizing this option, the annual practice requirements will be performed on material or welds that contain cracks, or by analyzing prerecorded data from material or welds that contain cracks. All training will be completed no earlier than 6 months prior to performing ultrasonic examinations. The implementation of ASME Section XI, Appendix VII requirements is addressed in Section 12 of this ISI Program Manual and Dominion Fleet Procedure No. ER-AA-NDE-121.

1.8.10 MPS3 will not implement the optional Appendix VIII specimen set and qualification provisions in paragraphs (b)(2)(xv)(A) to (b)(2)(xv)(M) in accordance with 10 CFR 50.55a(b)(2)(xv). The implementation of ASME Section XI, Appendix VIII requirements is addressed in Section 12 of this ISI Program Manual and Dominion Fleet Procedure No. ER-AA-NDE-122. Note that the alternative requirements of Code Case N-695 will be utilized in lieu of those in Appendix VIII, Supplement 10. In addition, the alternative requirements of Code Case N-696 will be utilized in lieu of those in Appendix VIII, Supplements 2, 3 and 10.

1.8.11 As required by 10 CFR 50.55a(b)(2)(xvi)(A) and 10 CFR 50.55a(b)(2)(xvi)(B), MPS3 examinations performed from one side of a ferritic vessel weld and examinations performed from one side of a ferritic or stainless steel pipe will be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. The implementation of ASME Section XI, Appendix VIII requirements is addressed in Section 12 of this ISI Program Manual and Dominion Fleet Procedure No. ER-AA-NDE-122.

1.8.12 As required by 10 CFR 50.55a(b)(2)(xviii)(A), Level I and II nondestructive examination personnel at MPS3 will be recertified on a 3-year interval in lieu of the 5-year interval specified in IWA-2314(a) and IWA-2314(b) of the 2004 Edition. The certification of visual examination personnel is addressed in Dominion Fleet Procedure No. ER-AA-NDE-123.

1.8.13 As required by 10 CFR 50.55a(b)(2)(xviii)(B), paragraph IWA-2316 of the 2004 Edition will only be used to qualify personnel that observe for leakage during system leakage and hydrostatic tests conducted in accordance with IWA-5211(a) and (b). The certification of visual examination personnel is addressed in Dominion Fleet Procedure No. ER-AA-NDE-123.

1.8.14 As required by 10 CFR 50.55a(b)(2)(xviii)(C), when qualifying visual examination personnel for VT-3 visual examinations under paragraph IWA-2317 of the 2004 Edition, the proficiency of the training must be demonstrated by administering an initial qualification examination and administering subsequent examinations on a 3-year interval. The certification of visual examination personnel is addressed in Dominion Fleet Procedure No. ER-AA-NDE-123.

1.8.15 As required by 10 CFR 50.55a(b)(2)(xix), MPS3 will apply the rules in IWA-2240 of Section XI, 1997 Addenda in lieu of the IWA-2240 requirements in Section XI, 2004 Edition for the substitution of alternative examination methods.

1.8.16 As required by 10 CFR 50.55a(b)(2)(xx)(B), the NDE provision in IWA-4540(a)(2) of the 2002 Addenda of Section XI will be applied when performing system leakage tests after repair and replacement activities performed by welding or brazing on a pressure retaining boundary using the 2004 Edition of ASME Section XI. Repair Replacement activities are addressed in Dominion Fleet Repair Replacement Program Procedure No. ER-AA-RRM-100.

1.8.17 As required by 10 CFR 50.55a(b)(2)(xxi)(A), the provisions of Table IWB-2500-1, Examination Category B-D, Full Penetration Welded Nozzles in Vessels, Items Nos. B3.120 and B3.140 of

Inspection Program B in the 1998 Edition will be applied by MPS3. As allowed by 10 CFR 50.55a(b)(2)(xxi)(A), a visual examination with enhanced magnification that has a resolution sensitivity to detect a 1-mil width wire or crack, utilizing the allowable flaw length criteria in Table IWB-3512-1, 2004 Edition, with a limiting assumption on the flaw aspect ratio (i.e., a/l = 0.5), may be performed in place of an ultrasonic examination.

1.8.18 The requirements of 10 CFR 50.55a(b)(2)(xxi)(B) for Table IWB-2500-1, Examination Category B-G-2, Item B7.80, Pressure Retaining Control Rod Drive (CRD) Housing Bolting are not applicable to MPS3. The MPS3 design has threaded connections with canopy seals rather than Item No. B7.80 CRD bolting.

1.8.19 MPS3 will not implement the provision in IWA-2220, "Surface Examination" that allows the use of an ultrasonic examination method. The use of this provision is prohibited by 10 CFR 50.55a(b)(2)(xxii).

1.8.20 Prohibiting the use of IWA-4461.4.2 for eliminating mechanical processing of thermally cut surfaces as stated in 10 CFR 50.55a(b)(2)(xxiii) is not addressed in the MPS3 ISI Program. Repair Replacement activities are addressed in Dominion Fleet Repair Replacement Program Procedure ER-AA-RRM-100.

1.8.21 MPS3 will comply with 10 CFR 50.55a(b)(2)(xxiv) which prohibits the use of Appendix VIII and the supplements to Appendix VIII and Article I-3000 in the 2002 Addenda through the 2004 Edition.

1.8.22 Prohibiting the use of IWA-4340 for the mitigation of defects by modification as stated in 10 CFR 50.55a(b)(2)(xxv) is not addressed in the MPS3 ISI Program. Repair Replacement activities are addressed in Dominion Fleet Repair Replacement Program ER-AA-RRM-100.

1.8.23 Placing restrictions on the pressure testing of replaced components and appurtenances per IWA-4540(c) as stated in 10 CFR 50.55a(b)(2)(xxvi) is not addressed in the MPS3 ISI Program. Repair Replacement activities are addressed in Dominion Fleet Repair Replacement Program ER-AA-RRM-100.

1.8.24 10 CFR 50.55a(b)(2)(xxvii) modifies the requirements of IWA-5242 for insulation removal from 17-4 PH or 410 stainless steel studs or bolts aged at a temperature below 1100°F or those having a Rockwell Method C hardness value above 30, and from A-286 stainless steel studs or bolts preloaded to 100,000 pounds per square inch or higher. These requirements will be implemented at MPS3.

1.8.25 For MPS3, the examination and testing of snubbers, including attachment hardware, is performed per Technical Specification 3/4.7.10 in lieu of the requirements for snubbers in Section XI and IWF-5300(a) and (b). As such, there is no need to implement the optional criteria of 10 CFR 50.55a(b)(3)(v).

1.8.26 MPS3 will not implement the option in 10 CFR 50.55a(g)(4)(iii) to perform surface examinations on High Pressure Safety Injection System welds specified in Table IWB-2500-1, Examination Category B-J, Item Numbers B9.20, B9.21, and B9.22.

1.8.27 The implementation schedule for ASME Section XI, Appendix VIII as stated in 10 CFR 50.55a(g)(6)(ii)(C) was met during the Second Interval at MPS3.

1.8.28 MPS3 will meet the criteria of 10 CFR 50.55a(g)(6)(ii)(D) for the performance of reactor vessel head inspections, except for (5) Core Exit Thermocouple (CET) Penetration Nozzles for which relief is being requested similar to second interval Relief Request IR-2-46.

1.8.29 MPS3 will meet the criteria of 10 CFR 50.55a(g)(6)(ii)(E) for the performance of reactor coolant pressure boundary visual inspections.

2. INSPECTION PLAN

2.1 Class 1 Components

2.1.1 Exemption Basis

The classification basis for Class 1 components is described in Section 1.4. The exemptions of IWB-1220 are then applied to determine the components[1] subject to the examination requirements of Table IWB-2500-1. ASME Section XI, IWB-1220 exemptions for Class 1 components are listed below:

- components that are connected to the reactor coolant system and are part of the reactor coolant pressure boundary, and that are of such a size and shape so that upon postulated rupture the resulting flow of coolant from the reactor coolant system under normal plant operating conditions is within the capacity of makeup systems that are operable from on-site emergency power. The emergency core cooling systems are excluded from the calculation of makeup capacity.
- components and piping segments Nominal Pipe Size (NPS) 1 and smaller, except for steam generator tubing;
- components and piping segments which have one inlet and one outlet, both of which are NPS 1 and smaller;
- components[2] and piping segments which have multiple inlets or multiple outlets whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the Outside Diameter (OD) of NPS 1 pipe
- reactor vessel head connections and associated piping, NPS 2 and smaller, made inaccessible by control rod drive penetrations
- welds or portions of welds that are inaccessible due to being encased in concrete, buried underground, located inside a penetration, or encapsulated by guard pipe.

An alternative to the ASME Section XI requirements for the Inservice Inspection of Class 1 piping, Category B-J and B-F was implemented during the second interval based on the Risk Informed technology developed in accordance with the Westinghouse Owners Group Topical Report "WCAP 14572, Revision 1-NP-A". The request to use this alternative was

[1] The exemptions from examination in IWC-1220 may be applied to those components permitted to be Class 2 in lieu of Class 1 by the regulatory authority having jurisdiction at the plant site.
[2] For heat exchangers, the shell side and tube side may be considered separate components.

submitted to the Nuclear Regulatory Commission on July 25, 2000 with approval received on March 12, 2002.

The ISI Program does not currently address the piping examination requirements that will result from the implementation of risk-informed technology. DNC is presently updating the risk-informed program for the examination of piping that will be applicable to Class 1 piping, as a minimum. Upon development of the risk-informed program, and required supporting documents, a supplemental submittal to the third interval ISI Program will be provided. This supplemental submittal will address the risk-informed scope and modifications to the examination requirements of affected piping components.

Applicable portions of the systems listed below are included in the Class 1 boundary and are depicted by Zone drawings 1 through 52.

System pressure testing of Class 1 components is described in Section 5.0. Zone 999 is used for system pressure tests, but not shown on zone boundary drawings.

2.1.2 Component/Piping Examinations

The examination schedule for Class 1 components during the third inspection interval is included in the ISI Database. Major Class 1 components and related information is provided in the following sections.

A. Reactor Pressure Vessel (RPV)

RPV shell examinations are conducted from the internal surfaces utilizing remote examination equipment and techniques. Those areas of the bottom head which are obstructed from a complete Inside Diameter (ID) examination may be supplemented from the OD as practical. The flange to upper shell weld is examined from the upper shell ID and manually from the flange seal surface. The annular area surrounding the bolt holes is examined manually from the flange mating surface. Closure studs are manually examined utilizing surface and alternative volumetric techniques, as applicable. Alternative volumetric examination of the closure studs is in accordance with Category B-G-1, Note 7.

Core support lugs and the applicable portions of the vessel ID are examined visually utilizing a remote examination inspection system.

The RPV examinations are performed to meet the requirements of ASME Section XI and the intent of Regulatory Guide 1.150.

B. Reactor Vessel Closure Head

The RPV closure head is ultrasonically examined utilizing manual techniques from the OD surface. The RPV closure head examinations are performed to meet the requirements ASME Section XI and the intent of Regulatory Guide 1.150.

The peripheral CRDM welds and extension tube welds will be ultrasonically examined utilizing manual techniques from the OD or will be examined utilizing surface examination methods from the ID.

C. Steam Generators (Primary Side)

Applicable steam generator welds (e.g., the tube sheet to channel head weld and nozzle to vessel welds) are ultrasonically examined utilizing manual techniques from the OD surface. Primary manway bolting is visually examined.

The nozzle inner radius sections are ultrasonically examined utilizing manual techniques from the OD surface. Alternatively, as allowed by 10 CFR 50.55a(b)(2)(xxi)(A) a visual examination with enhanced magnification may be performed.
Note: Examination Category B-D, Item number B3.140 of ASME Section XI, 1998 Edition applies, as required by 10 CFR 50.55a(b)(2)(xxi)(A).

D. Pressurizer

Applicable pressurizer welds are ultrasonically examined utilizing manual techniques from the OD surface. Manway bolting is visually examined.

The support skirt-to-shell weld is examined utilizing surface examination methods. Relief was requested for the inside surface of the weld during the first ten-year inspection interval due to component geometric configuration and Code criteria. Supplemental best effort UT was performed from the OD surface during the second interval examination as a commitment from second interval Relief Request IR-2-26 Rev.1. Based on the new criteria in the 2004 Edition of ASME Section XI, surface examination of the inside surface of the weld is no longer required, so no third interval Relief Request is needed.

The nozzle-to-shell welds are ultrasonically examined utilizing manual techniques from the OD surface.

The nozzle inner radius sections are ultrasonically examined utilizing manual techniques from the OD surface. Alternatively, as allowed by 10 CFR 50.55a(b)(2)(xxi)(A) a visual examination with enhanced magnification may be performed.
Note: Examination Category B-D, Item number B3.120 of ASME Section XI, 1998 Edition applies as required by 10 CFR 50.55a(b)(2)(xxi)(A).

The six pressurizer nozzle to safe-end welds consist of Inconel 82/182 material and have received a full structural weld overlay that also encompasses their adjacent safe-end to pipe welds. The weld overlays will be examined using the examination requirements of Code Case N-770. See Relief Request IR-3-05.

E. Pressure Boundary Piping

An alternative to the ASME Section XI requirements for the Inservice Inspection of Class 1 piping, Category B-J and B-F was implemented during the second interval based on the Risk Informed technology developed in accordance with the Westinghouse Owners Group Topical Report "WCAP 14572, Revision 1-NP-A". The request to use this alternative was submitted to the Nuclear Regulatory Commission on July 25, 2000 with approval received on March 12, 2002.

The ISI Program does not currently address the piping examination requirements that will result from the implementation of risk-informed technology. DNC is presently updating the risk-informed program for the examination of piping that will be applicable to Class 1 piping, as a minimum.

Upon development of the risk-informed program, and required supporting documents, a supplemental submittal to the third interval ISI Program will be provided. This supplemental submittal will address the risk-informed scope and modifications to the examination requirements of affected piping components. .

MPS3 will meet the criteria of 10 CFR 50.55a(g)(6)(ii)(E) for the performance of reactor coolant pressure boundary visual inspections.

F. Valve Bolting

The main coolant isolation valve bolting and flange surfaces (when disassembled) are examined utilizing volumetric and visual (VT-1) methods in accordance with Examination Category B-G-1.

Other Class 1 valve bolting is less than 2-inch diameter and is examined utilizing visual (VT-1) methods in accordance with Examination Category B-G-2.

Visual examination (VT-3) of the valve internal pressure boundary surfaces will be performed in accordance with Examination Category B-M-2 upon disassembly.

G. Welded Attachments

Applicable welded attachments are examined utilizing volumetric or surface examination methods, as appropriate.

H. Reactor Coolant Pumps (RCPs)

The RCP studs and nuts are examined utilizing ultrasonic and visual (VT-1) examination methods, respectively. The pump interior and flange surface require visual examination (VT-3 and VT-1, respectively) in the event the pump is disassembled.

I. Steam Generator Eddy Current Testing (ECT)

The steam generator tubing surveillance requirements are contained in the MPS3 Plant Technical Specifications. The examination requirements are based on EPRI PWR Steam Generator Examination Guidelines, Rev. 7, dated October 2007.

2.2 Class 2 Components

2.2.1 Exemption Basis

The classification basis for Class 2 components is described in Section 1.4. The exemptions of IWC-1220 are then applied to determine the components subject to the examination requirements of Table IWC-2500-1. ASME Section XI, IWC-1221, IWC-1222 and IWC-1223 exemptions for Class 2 components are listed below:

IWC-1221: Components Within RHR, ECC, and CHR Systems or portions of systems:

a) For systems, except high pressure safety injection systems in pressurized water reactor plants:

- components and piping segments NPS 4 and smaller
- components and piping segments which have one inlet and one outlet, both of which are NPS 4 and smaller
- components and piping segments which have multiple inlets or multiple outlets, whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 4 pipe

b) For high pressure safety injection systems in pressurized water reactor plants:

- components and piping segments NPS 1½ and smaller
- components and piping segments which have one inlet and one outlet, both of which are NPS 1½ and smaller
- components and piping segments which have multiple inlets or multiple outlets whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 1½ pipe

c) Vessels, piping, pumps, valves, other components, and component connections of any size in statically pressurized, passive (i.e., no pumps) safety injection systems of pressurized water reactor plants.

d) Piping and other components of any size beyond the last shutoff valve in open ended portions of systems that do not contain water during normal plant operating conditions.

IWC-1222: Components Within Systems or Portions of Systems Other Than RHR, ECC, and CHR Systems:

a) For systems, except auxiliary feedwater systems in pressurized water reactor plants:
- components and piping systems NPS 4 and smaller
- components and piping segments which have one inlet and one outlet, both of which are NPS 4 and smaller
- components and piping segments which have multiple inlets or multiple outlets whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 4 pipe

b) For auxiliary feedwater systems in pressurized water reactor plants:
- components and piping segments NPS 1½ and smaller
- components and piping segments which have one inlet and one outlet, both of which are NPS 1½ and smaller
- components and piping segments which have multiple inlets or multiple outlets whose cumulative pipe cross-sectional does not exceed the cross-sectional area defined by the OD of NPS 1½ pipe

c) Vessels, piping, pumps, valves, other components, and component connections of any size in systems or portions of systems that operate (when the system function is required) at a pressure equal to or less than 275 psig and at a temperature equal to or less than 200°F.

d) Piping and other components of any size beyond the last shutoff valve in open ended portions of systems that do not contain water during normal plant operating conditions

(1) RHR, ECC, and CHR systems are the Residual Heat Removal, Emergency Core Cooling, and Containment Heat Removal Systems, respectively.

(2) For heat exchangers, the shell side and tube side may be considered separate components.

(3) Statically pressurized, passive safety injection systems of pressurized water reactor plants are typically called:

(a) accumulator tank and associated system
(b) safety injection tank and associated system
(c) core flooding tank and associated system

IWC-1223: Inaccessible Welds

a) Welds or portions of welds that are inaccessible due to being encased in concrete, buried underground, located inside a penetration, or encapsulated by a guard pipe.

Applicable portions of the systems listed below are included in the Class 2 boundary and are depicted by Zone drawings 53 through 133.
System pressure testing of Class 2 components is described in Section 5.0. Zone 999 is used for system pressure tests, but not shown on zone boundary drawings.

2.2.2 Component/Piping Examinations

The examination schedule for Class 2 components during the third inspection interval is included in the ISI Database. Major Class 2 components and related information are provided in the following sections.

A. Steam Generators (Secondary Side)

The steam generator welds and nozzle inner radius sections (FWS) are examined utilizing manual or automated ultrasonic techniques from the vessel OD of one steam generator (SG "A") as permitted by Examination Category C-A and C-B, Notes 3 and 4, respectively.

Relief request IR-3-02 addresses the component geometry limitations that preclude examination of the main steam nozzle inner radius.

B. Residual Heat Removal Heat Exchangers

The RHR heat exchanger welds are examined utilizing surface and ultrasonic examination methods as appropriate. The examinations may be limited to one vessel or distributed among the vessels as permitted by Examination Category C-A and C-B, Notes 3 and 4, respectively.

The inlet and outlet nozzles were fabricated with reinforcing plate for the nozzle area and are examined utilizing surface and visual (VT-2) methods in accordance with the requirements of Code Category C-B, Item numbers C2.31 and C2.33.

The support skirt to heat exchanger weld is examined utilizing surface examination techniques.

C. Pressure Retaining Bolting

The Main Steam Isolation Valve (MSIV) bonnet bolting and Safety Injection Pump casing studs are subject to the volumetric examination requirements of Examination Category C-D.

D. Pressure Retaining Welds in Piping

Circumferential piping system welds are examined utilizing surface and volumetric examination methods as required by Examination Categories C-F-1 and C-F-2. Code Case N-663 is being utilized by MPS3 for Class 2 piping weld examinations. This Code Case is approved for use in Regulatory Guide 1.147, Revision 15.

Ultrasonic examination of thin-walled material less than 0.375" inch thickness, is excluded from NDE requirements under table IWC-2500-1, but is part of the weld selection count as noted in Table 2.2. A 7.5 percent sample of these welds in RHR, ECCS, CHR systems has been scheduled for examination in accordance with Table 2.3, see Program Section 2.5.3.

2.3 <u>Class 3 Components</u>

2.3.1 Exemption Basis

In accordance with IWD-1210, examination requirements of Subsection IWD only apply to pressure retaining components and their welded attachments on Class 3 systems in support of the following functions:

- Reactor shutdown
- Emergency core cooling
- Containment heat removal
- Atmosphere cleanup
- Reactor residual heat removal
- Residual heat removal for spent fuel storage pool

The classification basis for Class 3 components is described in Section 1.4. The exemptions of IWD-1220 are then applied to determine the components subject to the examination requirements of Table IWD-2500-1. ASME Section XI, IWD-1220 exemptions for Class 3 components are listed below:

IWD-1222: Components Exempt From Examination

- components[1] and piping segments NPS 4 and smaller
- components and piping segments which have one inlet and one outlet, both of which are NPS 4 and smaller
- components[1] and piping segments which have multiple inlets or multiple outlets whose cumulative pipe cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 4 pipe
- components that operate at a pressure of 275 psig or less and at a temperature of 200°F or less in systems (or portions of systems) whose function is not required in support of reactor residual heat removal, containment heat removal, and emergency core cooling
- welds or portions of welds that are inaccessible due to being encased in concrete, buried underground, located inside a penetration, or encapsulated by guard pipe.

Applicable portions of the systems listed below are included in the Class 3 boundary and are depicted by Zone drawings 134 through 183.

System pressure testing of Class 3 components is described in Section 5.0. Zone 999 is used for system pressure tests, but not shown on zone boundary drawings.

2.3.2 Component/Piping Examinations

The examination schedule for Class 3 components during the third inspection interval is included in the ISI Database.

Class 3 welded attachments require visual examination (VT-1) in accordance with Table-IWD-2500-1, Examination Category D-A.

[1] For heat exchangers, the shell side and tube side may be considered separate components.

2.4 Component Supports

2.4.1 Exemption Basis

Component supports to be examined shall be the supports of those Class 1, Class 2, Class 3 and Class MC components not exempted under IWB-1220, IWC-1220, IWD-1220 and IWE-1220. Refer to Subsections 2.1 through 2.3 for information related to Class 1, 2, and 3 selection basis. Note that the MPS3 design does not include any Class MC component supports requiring examination. The exemptions of IWF-1230 are applied to determine the components subject to the examination requirements of Table IWF-2500-1. ASME Section XI, IWF-1230 exemptions for Component Supports are listed below:

IWF-1230: Supports Exempt From Examination

Supports exempt from the examination requirements of IWF-2000 are those connected to piping and other items exempted from volumetric, surface, or VT-1 or VT-3 visual examination by IWB-1220, IWC-1220, IWD-1220, and IWE-1220. In addition, portions of supports that are inaccessible by being encased in concrete, buried underground, or encapsulated by guard pipe are also exempt from the examination requirements of IWF-2000.

2.4.2 Examinations

The examination schedule for component supports during the third inspection interval is included in the ISI Database.

Component and piping supports require visual examination (VT-3) in accordance with Table-IWF-2500-1, Examination Category F-A.

2.5 Augmented Examinations

The augmented examinations described in this section are summarized in Table 2.5-1.

2.5.1 Reactor Coolant Pump Flywheels

The reactor coolant pump flywheels are examined in accordance with Technical Specification 4.4.10 based on the Safety Evaluation Report (SER) for WCAP 14535, dated September 12, 1996. Each RCP flywheel receives an in-place ultrasonic examination, or a surface examination if the flywheel is disassembled, at least once every 10 years.

2.5.2 High Energy System Break Exclusion Area (BEA)

Class 2 high energy piping systems within the designated BEA, as described in Final Safety Analysis Report (FSAR) Section 3.6 and FSAR Figures 3.6-8 through 3.6-17, shall receive augmented examinations in accordance with FSAR Section 3.6.2.1.2.2.F.

These augmented examinations will be performed in accordance with the risk-informed methodology established in WCAP-14572, revision 1-N-A, Addenda 1. The welds identified for examination are documented in Engineering Record of Correspondence (ERC) 25212-ER-08-0044, Rev 0.

Piping greater than four inch NPS4 shall receive a surface and volumetric examination. Piping less than or equal to four inch NPS shall receive a surface examination. The examination volumes are defined in accordance with Examination Category C-F-1 and C-F-2 for Class 2 piping welds and are specifically denoted in the inspection plan as requiring augmented examination.

The systems affected are:

- Main Steam System (MSS)
- Main Feedwater System (FWS)
- Turbine Plant Drains (DTM)

A list of weld numbers for piping subject to the augmented requirements for BEA is included in Table 2.4.

2.5.3 Class 2 Excluded Systems

The welds in the Chemical and Volume Control System (CHS) and High Pressure Safety Injection (SIH) for Examination Category C-F-1 were excluded from examination because of nominal wall thickness. A 7.5% sample of each system prorated among line sizes is scheduled as an augmented examination during the third inspection interval.

2.5.4 Reactor Vessel Bottom Mounted Instrument Nozzles (58)

Effective January 1, 2009, the mandatory examination requirements of Code Case N-722 apply replacing the requirements of NRC Bulletin 2003-02.

- 100% bare metal visual examination required every other refuel outage

2.5.5 Reactor Vessel Head Penetrations

Effective December 29, 2008, the mandatory examination requirements of Code Case N-729-1 apply replacing the requirements of NRC Order EA-03-009.

- 100% bare metal visual examination of all penetrations required every third refuel outage or 5 calendar years, whichever is less, provided a VT-2 visual examination is performed under the insulation through multiple access points in outages where the 100% bare metal visual is not completed.

  (Note: Requirement is for units with EDY as defined in Code Case N-729-1, of less than 8 and with no flaws detected that were unacceptable for continued service, which apply to MPS3.).

- Volumetric / Surface examination for all nozzles required every 8 calendar years or before Reinspection Years (RIY) as defined in Code Case N-729-1, equals 2.25, whichever is less.

2.5.6 Additional examinations for Class 1 Alloy 600/82/182 Pressure Retaining Welds.

- Effective January 1, 2009, the mandatory examination requirements of Code Case N-722 apply. Examination requirements and frequency are identified in Table 1 of this Code Case.

2.6 **Description of ISI Schedule Summaries**

The third ten-year ISI Schedule tables contain component examination information for MPS3. The inspection schedule tables are prepared from the computerized database utilized to schedule and track ASME Section XI and augmented components for examination.

2.6.1 ASME Section XI Inservice Inspection Examination Summary Tables

The Class 1, 2 and 3 components and component supports requiring examination per ASME Section XI are shown in Table 2.1. The ASME Section XI Inservice Inspection Examination Summary Table 2.1 provides the following information:

- Examination Category

  This column lists the examination category as identified in ASME Section XI, Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, and IWF-2500-1.

- Item Number

  This column lists the Code Item No. as identified in ASME Section XI, Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, and IWF-2500-1.

- Description of Components Examined

  This column lists a description of the components examined as identified in ASME Section XI, Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, and IWF-2500-1.

- Number of Components

  This column lists the total population of components potentially subject to examination. The number of components actually examined during the inspection interval will be based upon the Code requirements for the subject item number.

- Examination Method(s)

  The column lists the examination method(s) required by ASME Section XI, Tables IWB-2500-1, IWC-2500-1, IWD-2500-1, and IWF-2500-1.

- Request Number(s)

  This column provides a listing of applicable Requests for Alternatives or Relief Requests. If a request number is identified, see the corresponding Request for Alternative or Relief Request in Section 9.

2.6.2 Risk-Informed Inservice Inspection Examination Summary Table

The Class 1 piping welds which will require examination upon completion of the risk informed program update, are shown in Table 2.2. The Risk-Informed Inservice Inspection Examination Summary Table 2.2 provides the following information:

- Examination Category

  This column lists the examination category as identified in ASME Section XI Code Case N-577-1.

- Item Number

  This column lists the Code Item No. as identified in ASME Section XI Code Case N-577-1.

- Parts Examined

  This column provides a description of the elements to be examined, which are classified by their potential degradation mechanism.

- Number of Components

  This column lists the total population of components that are subject to examination and will be populated upon completion of the risk informed program update. Upon completion of the risk informed program update, the number of components actually examined during the inspection interval will be based on Westinghouse WCAP 14572, Revision 1-NP-A.

- Examination Method(s)

  The column lists the examination method(s) required in accordance with the RI-ISI application which will be based on Westinghouse WCAP 14572, Revision 1-NP-A.

- Request Number(s)

  This column provides a listing of applicable Requests for Alternatives or Relief Requests. If a request number is identified, see the corresponding Request for Alternative or Relief Request in Section 9.

2.6.3 Augmented Examination Summary Table

MPS3 components requiring augmented examinations are shown in Table 2.3. The Augmented Examination Summary Table 2.3 provides the following information:

- Program Section

  This column lists the section of this ISI Plan that addresses the subject augmented examinations

- Description of Parts or Components Examined

  This column provides a description of the elements to be examined.

- Database Item No.

  This column provides a reference to the Item No. used for the augmented examination in the ISI Database.

- Examination Method(s)

  The column lists the examination method(s) required in accordance with the implementing augmented examination criteria.

- System

  This column provides a reference to the system that the components are in.

- Zone No. or Size

  This column provides a reference to the Zone No. that the components are in or the line size.

- Total Item Nos.

  This column lists the total population of components potentially subject to examination. The number of components actually examined during the inspection interval will be in accordance with implementing augmented examination criteria.

- Comments

  This column provides any comments associated with the item.

2.6.4 Break Exclusion Area (BEA) Weld Listing

Table 2.4 lists the welds subject to examination in the break exclusion region as documented in ERC 25212-ER-08-0044 broken down by Zone No. and Drawing No.

2.7 **Procedures**

Nondestructive examination procedures are listed in Table 2.5. Other NDE procedures may be utilized provided they are reviewed and accepted in accordance with applicable station procedure.

2.8 **Examination Zone Listing**

The inspection plan has been divided into areas of interest identified as "zones". Each zone is defined by a drawing which identifies and locates the components requiring examination for the subject zone (except Zone 999 is not shown on drawings, but is discussed in Section 5.0).

A listing of examination zones and their associated drawings is provided in Table 2.6. The examination zone boundary drawings are controlled plant drawings and are listed below:

Class 1 Boundaries	25212-20997
Class 2 Boundaries	25212-20998 Sht. 1 and 2
Class 3 Boundaries	25212-20999 Sht. 1, 2, and 3

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-A Pressure Retaining Welds in Reactor Vessel		**Shell Welds**			IR-3-08
	B1.11	Circumferential	2	Volumetric	
	B1.12	Longitudinal	9	Volumetric	
		Head Welds			
	B1.21	Circumferential	3	Volumetric	
	B1.22	Meridional	8	Volumetric	
	B1.30	Shell-to-Flange Weld	1	Volumetric	
	B1.40	Head-to-Flange Weld	1	Volumetric and Surface	
	B1.51	Repair Welds in the Beltline Region	N/A	Volumetric	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-B Pressure Retaining Welds in Vessels Other Than Reactor Vessels		**Pressurizer Shell to Head Welds**			
	B2.11	Circumferential	2	Volumetric	
	B2.12	Longitudinal	2	Volumetric	
		Pressurizer Head Welds			
	B2.21	Circumferential	0	Volumetric	
	B2.22	Meridional	0	Volumetric	
		Steam Generator (Primary Side) Head Welds			
	B2.31	Circumferential	0	Volumetric	
	B2.32	Meridional	0	Volumetric	
	B2.40	Tubesheet to Head Weld	4	Volumetric	
		Heat Exchangers (Primary Side) – Head Welds			
	B2.51	Circumferential	0	Volumetric	
	B2.52	Meridional	0	Volumetric	
		Heat Exchangers (Primary Side) – Shell			
	B2.60	Tubesheet-to-Head Welds	0	Volumetric	
	B2.70	Longitudinal Welds	0	Volumetric	
	B2.80	Tubesheet-to-Shell Welds	0	Volumetric	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-D Full Penetration Welded Nozzles in Vessels, Inspection Program A		**Reactor Vessel**			
	B3.10	Nozzle-to-Vessel Welds	N/A	Volumetric	
	B3.20	Nozzle Inside Radius Section (Examined with B3.90)	N/A	Volumetric	
		Pressurizer			
	B3.30	Nozzle-to-Vessel Welds	N/A	Volumetric	
	B3.40	Nozzle Inside Radius Section	N/A	Volumetric/ VT-1 Visual	
		Steam Generator (Primary Side)			
	B3.50	Nozzle-to-Vessel Welds	N/A	Volumetric	
	B3.60	Nozzle Inside Radius Section	N/A	Volumetric/ VT-1 Visual	
		Heat Exchangers (Primary Side)			
	B3.70	Nozzle-to-Vessel Welds	N/A	Volumetric	
	B3.80	Nozzle Inside Radius Section	N/A	Volumetric	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-D Full Penetration Welded Nozzles in Vessels, Inspection Program B		**Reactor Vessel**			
	B3.90	Nozzle-to-Vessel Welds	8	Volumetric	
	B3.100	Nozzle Inside Radius Section (Examined with B3.90)	8	Volumetric	
		Pressurizer			
	B3.110	Nozzle-to-Vessel Welds	6	Volumetric	
	B3.120	Nozzle Inside Radius Section	6	Volumetric/ VT-1 Visual (See Note 1)	
		Steam Generator (Primary Side)			
	B3.130	Nozzle-to-Vessel Welds	8	Volumetric	
	B3.140	Nozzle Inside Radius Section	8	Volumetric/ VT-1 Visual (See Note 1)	
		Heat Exchangers (Primary Side)			
	B3.150	Nozzle-to-Vessel Welds	0	Volumetric	
	B3.160	Nozzle Inside Radius Section	0	Volumetric	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-F Pressure Retaining Dissimilar Metal Welds In Vessel Nozzles		**Reactor Vessel**	See Note 2 and Table 2.2 (For All Item Numbers)	See Note 2 and Table 2.2 (For All Item Numbers)	
	B5.10	NPS 4 or Larger, Nozzle-to-Safe End Butt Welds			
	B5.20	Less than NPS 4 Nozzle-to-Safe End Butt Welds			
	B5.30	Nozzle-to-Safe End Socket Welds			
		Pressurizer			
	B5.40	NPS 4 or Larger, Nozzle-to-Safe End Butt Welds			
	B5.50	Less than NPS 4 Nozzle-to-Safe End Butt Welds			
	B5.60	Nozzle-to-Safe End Socket Welds			
		Steam Generator			
	B5.70	NPS 4 or Larger, Nozzle-to-Safe End Butt Welds			
	B5.80	Less than NPS 4 Nozzle-to-Safe End Butt Welds			
	B5.90	Nozzle-to-Safe End Socket Welds			
		Heat Exchangers			
	B5.100	NPS 4 or Larger, Nozzle-to-Safe End Butt Welds			
	B5.110	Less than NPS 4, Nozzle-to-Safe End Butt Welds			
	B5.120	Nozzle-to-Safe End Socket Welds			

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
		Reactor Vessel			
	B6.10	Closure Head Nuts	54	VT-1 Visual	
	B6.20	Closure Studs	54	Volumetric	
	B6.40	Threads In Flange	54	Volumetric	
	B6.50	Closure Washers, Bushings	54	VT-1 Visual	
		Pressurizer			
B-G-1 Pressure Retaining Bolting Greater Than 2 in. In Diameter	B6.60	Bolts and Studs	0	Volumetric	
	B6.70	Flange Surface, when connection disassembled	0	VT-1 Visual	
	B6.80	Nuts, Bushings, and Washers	0	VT-1 Visual	
		Steam Generators			
	B6.90	Bolts and Studs	0	Volumetric	
	B6.100	Flange Surface, when connection disassembled	0	VT-1 Visual	
	B6.110	Nuts, Bushings, and Washers	0	VT-1 Visual	
		Heat Exchangers			
	B6.120	Bolts and Studs	0	Volumetric	
	B6.130	Flange Surface, when connection disassembled	0	VT-1 Visual	
	B6.140	Nuts, Bushings, and Washers	0	VT-1 Visual	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-G-1 Pressure Retaining Bolting Greater Than 2 in. In Diameter (cont'd)		**Piping**			
	B6.150	Bolts and Studs	0	Volumetric	
	B6.160	Flange Surface, when connection is disassembled	0	VT-1 Visual	
	B6.170	Nuts, Bushings, and Washers	0	VT-1 Visual	
		Pumps			
	B6.180	Bolts and Studs	4	Volumetric	
	B6.190	Flange Surface, when connection is disassembled	4	VT-1 Visual	
	B6.200	Nuts, Bushings, and Washers	0	VT-1 Visual	
		Valves			
	B6.210	Bolts and Studs	8	Volumetric	
	B6.220	Flange Surface, when connection disassembled	8	VT-1 Visual	
	B6.230	Nuts, Bushings, and Washers	8	VT-1 Visual	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-G-2 Pressure Retaining Bolting, 2 in. and Less In Diameter		**Reactor Vessel**			
	B7.10	Bolts, Studs, and Nuts	0	VT-1 Visual	
		Pressurizer			
	B7.20	Bolts, Studs, and Nuts	1 (16 Studs & 16 Nuts)	VT-1 Visual	
		Steam Generator			
	B7.30	Bolts, Studs, and Nuts	16 (128 Studs and 128 Nuts	VT-1 Visual	
		Heat Exchangers			
	B7.40	Bolts, Suds, and Nuts	0	VT-1 Visual	
		Piping			
	B7.50	Bolts, Studs, and Nuts	8	VT-1 Visual	
		Pumps			
	B7.60	Bolts, Studs, and Nuts	4	VT-1 Visual	
		Valves			
	B7.70	Bolts, Studs, and Nuts	32	VT-1 Visual	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-J Pressure Retaining Welds in Piping		**NPS 4 or Larger**	See Note 2 and Table 2.2 (For All Item Numbers)	See Note 2 and Table 2.2 (For All Item Numbers)	
	B9.11	Circumferential Welds			
		Less Than NPS 4			
	B9.21	Circumferential Welds Other Than PWR High Pressure Safety Injection Systems			
	B9.22	Circumferential Welds of PWR High Pressure Safety Injection Systems			
		Branch Pipe Connection Welds			
	B9.31	NPS 4 or Larger			
	B9.32	Less Than NPS 4			
	B9.40	Socket Welds			
B-K Welded Attachments for Class 1 Vessels, Piping, Pumps, and Valves		**Pressure Vessels**			
	B10.10	Welded Attachments	9	Surface	
		Piping			
	B10.20	Welded Attachments	9	Surface	
		Pumps			
	B10.30	Welded Attachments	0	Surface	
		Valves			
	B10.40	Welded Attachments	0	Surface	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-L-1 Pump Casing Welds	B12.10	**Pumps** Pump Casing Welds	0	VT-1 Visual	
B-L-2 Pump Casings	B12.20	**Pumps** Pump Casing	4	VT-3 Visual	
B-M-1 Valve Body Welds	B12.30	**Valves** Valves, Less than NPS 4, Valve Body Welds	0	Surface	
B-M-2 Valve Body	B12.50	**Valves** Valves Exceeding NPS 4, Valve Internal Surfaces	39	VT-3 Visual	
B-N-1 Interior of Reactor Vessel	B13.10	**Reactor Vessel** Vessel Interior	1	VT-3 Visual	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-N-2 Welded Core Support Structures and Interior Attachments to Reactor Vessels		**Reactor Vessel (BWR)**			
	B13.20	Interior Attachments Within Beltline Region	N/A	VT-1 Visual	
	B13.30	Interior Attachments Beyond Beltline Region	N/A	VT-3 Visual	
	B13.40	Core Support Structure	N/A	VT-3 Visual	
		Reactor Vessel (PWR)			
	B13.50	Interior Attachments Within Beltline Region	0	VT-1 Visual	
	B13.60	Interior Attachments Beyond Beltline Region	7	VT-1 Visual	
B-N-3 Removable Core Support Structures		**Reactor Vessel**			
	B13.70	Core Support Structure	2	VT-3 Visual	
B-O Pressure Retaining Welds in Control Rod Housings		**Reactor Vessel (BWR)**			
	B14.10	Welds in CRD Housing	N/A	Volumetric or Surface	
		Reactor Vessel (PWR)			
	B14.20	Welds in CRD Housing	40 Periphereral Housings	Volumetric or Surface	
	B14.21	Welds in In-Core Instrumentation Nozzle Housings >NPS 2	0	Volumetric or Surface	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
B-P All Pressure Retaining Components	B15.10	Pressure Retaining Components	Class 1 Pressure Boundary	VT-2 Visual	IR-3-09 IR-3-10 IR-3-11
B-Q Steam Generator Tubing	B16.10	Steam Generator Tubing in Straight Tube Design	N/A	Volumetric	
	B16.20	Steam Generator Tubing in U-Tube Design	4 Steam Generators	Volumetric	
C-A Pressure Retaining Welds in Pressure Vessels	C1.10	Shell Circumferential Welds	12	Volumetric	
	C1.20	Head Circumferential Welds	6	Volumetric	
	C1.30	Tubesheet-to-Shell Weld	6	Volumetric	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
C-B Pressure Retaining Nozzle Welds in Vessels		**Nozzles in Vessels ≤ ½ in. Nominal Thickness**			IR-3-02
	C2.11	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Weld	0	Surface	
		Nozzles Without Reinforcing Plate in Vessels > ½ in. Nominal Thickness			
	C2.21	Nozzle-to Shell (Nozzle to Head or Nozzle to Nozzle) Weld	8	Volumetric and Surface	
	C2.22	Nozzle Inside Radius Section	8	Volumetric	
		Nozzles With Reinforcing Plate in Vessels > ½ in. Nominal Thickness			
	C2.31	Reinforcing Plate Welds to Nozzle and Vessel	8	Surface	
	C2.32	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Welds When Inside of Vessel is Accessible	0	Volumetric	
	C2.33	Nozzle-to-Shell (Nozzle to Head or Nozzle to Nozzle) Welds When Inside of Vessel is Inaccessible	4	VT-2 Visual	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
C-C Welded Attachments for Class 2 Vessels, Piping, Pumps, and Valves		**Pressure Vessels**			
	C3.10	Welded Attachments	32	Surface	
		Piping			
	C3.20	Welded Attachments	44	Surface	
		Pumps			
	C3.30	Welded Attachments	6	Surface	
		Valves			
	C3.40	Welded Attachments	0	Surface	
C-D Pressure Retaining Bolting Greater than 2 in. In Diameter		**Pressure Vessels**			
	C4.10	Bolts and Studs	0	Volumetric	
		Piping			
	C4.20	Bolts and Studs	0	Volumetric	
		Pumps			
	C4.30	Bolts and Studs	2	Volumetric	
		Valves			
	C4.40	Bolts and Studs	4	Volumetric	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
C-F-1 Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping		**Piping Welds ≥ 3/8 in. Nominal Wall Thickness for Piping > NPS 4**			
	C5.11	Circumferential Weld	1334	Volumetric and Surface (See Note 3)	
		Piping Welds > 1/5 in. Nominal Wall Thickness for Piping ≥ NPS 2 and ≤ NPS 4			
	C5.21	Circumferential Weld	216	Volumetric and Surface (See Note 3)	
	C5.30	Socket Welds	209	Surface (See Note 3)	
		Piping Branch Connections of Branch Piping ≥ NPS 2			
	C5.41	Circumferential Weld	5	Surface (See Note 3)	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
C-F-2 Pressure Retaining Welds in Carbon or Low Alloy Steel Piping		**Piping Welds ≥ 3/8 in. Nominal Wall Thickness for Piping > NPS 4**			
	C5.51	Circumferential Weld	392	Volumetric and Surface (See Note 3)	
		Piping Welds > 1/5 in. Nominal Wall Thickness for Piping ≥ NPS 2			
	C5.61	Circumferential Weld	0	Volumetric and Surface (See Note 3)	
	C5.70	Socket Welds	0	Surface (See Note 3)	
		Pipe Branch Connections of Branch Piping ≥ NPS 2			
	C5.81	Circumferential Weld	40	Surface (See Note 3)	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
C-G Pressure Retaining Welds in Pumps and Valves		**Pumps**			
	C6.10	Pump Casing Welds	2	Surface	
		Valves			
	C6.20	Valve Body Welds	20	Surface	
C-H All Pressure Retaining Components	C7.10	Pressure Retaining Components	Class 2 Pressure Boundary	VT-2 Visual	IR-3-06
D-A Welded Attachments for Class 3 Vessels, Piping, Pumps and Valves		**Pressure Vessels**			
	D1.10	Welded Attachments	14	VT-1 Visual	
		Piping			
	D1.20	Welded Attachments	124	VT-1 Visual	
		Pumps			
	D1.30	Welded Attachments	0	VT-1 Visual	
		Valves			
	D1.40	Welded Attachments	0	VT-1 Visual	

TABLE 2.1
MPS3 CLASS 1, 2, 3 COMPONENT AND COMPONENT SUPPORT ISI EXAMINATION SUMMARY

Examination Category	Item Number	Description of Components Examined	Number of Components	Examination Method(s)	Request Number(s)
D-B All Pressure Retaining Components	D2.10	Pressure Retaining Components	Class 3 Pressure Boundary	VT-2 Visual	IR-3-07
F-A Supports (See Note 4)	F1.10	Class 1 Piping Supports	375	VT-3 Visual	IR-3-01
	F1.20	Class 2 Piping Supports	393	VT-3 Visual	IR-3-01
	F1.30	Class 3 Piping Supports	711	VT-3 Visual	IR-3-01
	F1.40	Supports Other Than Piping Supports (Class 1, 2, 3, and MC)	72	VT-3 Visual	IR-3-01

Notes:

1. In accordance with 10 CFR 50.55a(b)(2)(xxi)(A), the 1998 Edition of ASME Section XI without Addenda must be applied for Examination Category B-D, Item Nos. B3.120 and B3.140. Although the 1999 Addenda eliminated Code Item Nos. B3.120 and B3.140, these Code Item Numbers were still active in the 1998 Edition, and therefore are included in the MPS3 ISI Program Plan. However, per 10 CFR 50.55a(b)(2)(xxi)(A) a visual examination with enhanced magnification that has a resolution sensitivity to detect a 1-mil width wire or crack, utilizing the allowable flaw criteria in Table IWB-3512-1 may be performed in place of an ultrasonic examination.
2. In 2002, MPS3 implemented a risk-informed inservice inspection program for Class 1 piping welds (i.e., Examination Categories B-F and B-J). As part of this application, the Class 1 circumferential piping welds were assigned alternate Examination Category and Code Item Numbers that are consistent with ASME Section XI Code Case N-577-1. The alternate risk-informed Examination Category and Code Item Numbers are shown in Table 2.2. The Class 1 circumferential piping welds that were previously listed in Table 2.1 have been moved to

Table 2.2. Note that the total number of Class 1 circumferential piping welds in the ISI Program remains unchanged. Only the designations have been changed to reflect the Examination Category and Code Item Numbers established in Code Case N-577-1.

3. For the Third Interval, MPS3 is implementing Code Case N-663 for Class 2 piping welds. Code Case N-663 states that surface examinations on these piping welds may be limited to areas identified by the Owner as susceptible to outside surface attack.
4. The examination and testing of snubbers, including attachment hardware, shall be conducted in accordance with Technical Specification 3/4.7.10. Details are provided in Relief Request No. IR-3-01

TABLE 2.2
MPS3 CLASS 1 RISK-INFORMED ISI EXAMINATION SUMMARY

Examination Category	Item Number	Parts Examined	Number of Components	Examination Method(s)	Request Number
R-A	R1.11	Elements Subject to Thermal Fatigue	To be populated following completion of Risk Informed Program Update	Volumetric	
	R1.12	Elements Subject to High Cycle Mechanical Fatigue		Visual, VT-2	
	R1.13	Elements Subject to Erosion Cavitation		Volumetric	
	R1.14	Elements Subject to Crevice Corrosion Cracking		Volumetric	
	R1.15	Elements Subject to Primary Water Stress Corrosion Cracking (PWSCC)		Volumetric	
	R1.16	Elements Subject to Intergranular or Transgranular Stress Corrosion Cracking (IGSCC, TGSCC)		Volumetric	
	R1.17	Elements Subject to Localized Microbiological Corrosion [Microbiologically-Induced Corrosion (MIC) or Pitting]		Visual, VT-3 on Internal Surfaces, or Volumetric	
	R1.18	Elements Subject to Flow Accelerated Corrosion (FAC)		Per FAC Program	
	R1.19	Elements Subject to External Chloride Stress Corrosion Cracking (ECSCC)		Surface	
	R1.20	Elements Not Subject to a Damage Mechanism		Volumetric	

TABLE 2.3
MPS3 THIRD INTERVAL AUGMENTED EXAMINATION SUMMARY

Program Section	Description of Parts or Components Examined	Database Item No.	Exam Method	System	Zone No. or Size	Total No. Items	Comments
Section 2.5.1	Reactor Coolant Pump Flywheels	RG 1.14	Vol. or Surface	RCS	008, 009, 010, & 011	5	T.S. 4.4.10
Section 2.5.2	High Energy Break Exclusion Area (BEA) Piping Welds-Welds > 4 NPS	B.E.A.	Vol. & Surface	Various	Various	216	
Section 2.5.2	High Energy Break Exclusion Area (BEA) Branch Conn. and Misc. Welds > 4 NPS and Piping Welds ≤ 4 NPS	B.E.A.	Surface	Various	Various	221	
Section 2.5.3	Circumferential Welds Excluded < 3/8" Nom. Thick.	C5.11	Vol. & Surface	CHS	6"	66	
Section 2.5.3	Circumferential Welds Excluded < 3/8" Nom. Thick.	C5.11	Vol. & Surface	CHS	8"	62	
Section 2.5.3	Circumferential Welds Excluded < 3/8" Nom. Thick.	C5.11	Vol. & Surface	SIH	6"	49	
Section 2.5.3	Circumferential Welds Excluded < 3/8" Nom. Thick.	C5.11	Vol. & Surface	SIH	8"	47	
Section 2.5.4	Reactor Vessel Bottom Mounted Instrument Nozzles	B15.80	Bare Metal	RPV	001	58	
Section 2.5.5	Reactor Vessel Head Penetrations	B4.10 B4.20	Bare Metal Vol. & Surface	RPV	001	79	Code Case N-729-1

TABLE 2.3
MPS3 THIRD INTERVAL AUGMENTED EXAMINATION SUMMARY (Continued)

Program Section	Description of Parts or Components Examined	Database Item No.	Exam Method	System	Zone No. or Size	Total No. Items	Comments
Section 2.5.6	Class 1 Alloy 600/82/182 Pressure Retaining Welds	B15.90 B15.95 B15.100 B15.120 B15.210	Visual (VE)	Various	Various	19	Code Case N-722

TABLE 2.4
MPS3 THIRD INTERVAL BREAK EXCLUSION AREA (BEA)
WELD LISTING

Zone No. 057 System: MS — Drawing 25212-20959

MSS-502-FW-6

Zone No. 058 System: MS — Drawing 25212-20960

MSS-503-FW-8

Zone No. 059 System: MS — Drawing 25212-20961

MSS-503-FW-4

Zone No. 060 System: MS — Drawing 25212-20962

MSS-501-FW-6

Zone No. 061 System MS — Drawing 25212-20975

DTM-34-FW-1	MSS-29-FW-1	MSS-33-FW-1-MM
MSS-28-FW-1	MSS-29-FW-3	MSS-33-FW-2
MSS-28-FW-4	MSS-33-FW-1-GM	

Zone No. 062 System: MS — Drawing 25212-20976

DTM-31-FW-1	MSS-30-FW-1	MSS-34-FW-2
MSS-27-FW-1	MSS-30-FW-3	MSS-34-FW-1-PM
MSS-27-FW-4	MSS-34-FW-1-MM	

Zone No. 063 System MS — Drawing 25212-20977

DTM-28-FW-1	MSS-31-FW-2	MSS-35-FW-1-GM
MSS-26-FW-2	MSS-31-FW-3	MSS-35-FW-1-RM
MSS-26-FW-3	MSS-35-FW-1	

Zone No. 064 System MS — Drawing 25212-20978

DTM-25-FW-1	MSS-32-FW-2	MSS-36-FW-1-XM
MSS-25-FW-2	MSS-32-FW-3	MSS-36-FW-1
MSS-25-FW-3	MSS-36-FW-1-HM	

Zone No. 065 System FWS — Drawing 25212-20963

FWS-23-FW-1

Zone No. 066 System FWS — Drawing 25212-20964

FWS-21-FW-1

TABLE 2.4
MPS3 THIRD INTERVAL BREAK EXCLUSION AREA (BEA)
WELD LISTING (continued)

Zone No. 067 System FWS — Drawing 25212-20965

FWS-22-FW-1

Zone No. 068 System FWS — Drawing 25212-20966

FWS-24-FW-1

Zone No. 069 System FWS — Drawing 25212-20979

FWS-11-FW-70	FWS-11-FW-74	FWS-11-FW-7-CM
FWS-11-FW-54	FWS-12-FW-27	FWS-11-FW-5-BM
FWS-11-FW-7-BM	FWS-11-FW-5-CM	

Zone No. 070 System FWS — Drawing 25212-20980

FWS-13-FW-6-BM	FWS-13-FW-67	FWS-13-FW-77
FWS-13-FW-97	FWS-13-FW-8-BM	FWS-14-FW-6
FWS-13-FW-65	FWS-13-FW-8-CM	

Zone No. 071 System FWS — Drawing 25212-20981

FWS-15-FW-6-BM	FWS-15-FW-64	FWS-15-FW-8-CM
FWS-15-FW-76	FWS-15-FW-7-LM	FWS-16-FW-30
FWS-15-FW-80	FWS-15-FW-8-BM	

Zone No. 072 — System FWS — Drawing 25212-20982

FWS-17-FW-65	FWS-17-FW-70	FWS-17-FW-7-CM
FWS-17-FW-5-BM	FWS-17-FW-92	FWS-18-FW-35
FWS-17-FW-5-CM	FWS-17-FW-7-BM	

Zone No. 122 — System MS — Drawing 25212-20996

DTM-394045-FW-6	DTM-394048-FW-25	MSS-509-1-SW-6
DTM-394045-FW-83	DTM-394048-FW-26	DTM-394052-FW-2
DTM-394048-FW-16	DTM-394048-FW-4	DTM-394052-FW-3
DTM-394048-FW-17-1	DTM-394052-FW-1	DTM-394052-FW-4
DTM-394048-FW-21-1	MSS-507-FW-3	MSS-509-FW-2-1
DTM-394048-FW-22-1	MSS-508-1-FW-84	MSS-508-FW-2-1

TABLE 2.5
LIST OF EXAMINATION PROCEDURES

Procedure No.	Application
ER-AA-NDE-PT-300	Liquid Penetrant Examination
ER-AA-NDE-MT-200	Magnetic Particle Examination
ER-AA-NDE-VT-600	Enhanced VT-1 Visual Examination of Nozzle Inside Radius Sections of Steam Generator Nozzles
ER-AA-NDE-VT-601	VT-1 Visual Examination
MP-VE-2	VT-2 Visual Examination
ER-AA-NDE-VT-602	VT-2 Visual Examination
ER-AA-NDE-VT-603	VT-3 Visual Examination
ER-AA-NDE-VT-607	VE Examination of Class 1 Alloy 600/82/182 Welds
MP-VE-4	Remote Visual Examination of the Reactor Vessel Internals
ER-AA-NDE-UT-800	Appendix VIII Qualified Equipment Tables for PDI
ER-AA-NDE-UT-801	Ultrasonic Examination of Ferritic Piping Welds
ER-AA-NDE-UT-802	Ultrasonic Examination of Austenitic Piping Welds
ER-AA-NDE-UT-803	Ultrasonic Through Wall Sizing of Pipe welds
ER-AA-NDE-UT-805	Ultrasonic Straight Beam Examination of Studs and Bolts.
ER-AA-NDE-UT-808	Ultrasonic Examination of Weld Overlaid Welds
ER-AA-NDE-UT-810	Ultrasonic Examination of Dissimilar Metal Welds
MP-PDI-UT-4	Ultrasonic Examination of Studs from the Heater Hole
MP-XT-4	Weld Marking Datum Points and Identifications
MP-UT-6	Ultrasonic Examination of RCP Flywheels
MP-UT-7	Ultrasonic Examination of Vessel Weld
MP-UT-46	Ultrasonic Examination of Steam Generator Primary Nozzle and Feedwater Nozzle Inner Radius Sections.
VPROC-NDE02-012 (Vendor)	Ultrasonic Examination of Pressurizer Spray, Relief and Safety Nozzle Inner Radius Sections
VPROC- ISI01-001 (Vendor)	Radiographic Examination of Welds

TABLE 2.6
EXAMINATION ZONE LISTING

Zone No.	Class 1 Systems	Drawing No. NDE	Hanger
1	Reactor Pressure Vessel	20900	20907 Sh 1
2	RPV Closure Head	20900	N/A
3	Steam Generator 1A Primary Side	20901	N/A
4	Steam Generator 1B Primary Side	20902	N/A
5	Steam Generator 1C Primary Side	20903	N/A
6	Steam Generator 1D Primary Side	20904	N/A
7	Pressurizer	20905	20993 Sh 7
8	Reactor Coolant Pump 1A	20906, 20914	20993 Sh 8&8A
9	Reactor Coolant Pump 1	20907, 20915	20993 Sh 9&9A
10	Reactor Coolant Pump 1C	20908, 20916	20993 Sh 10&10A
11	Reactor Coolant Pump 1D	20909, 20917	20993 Sh 11&11A
12	Reactor Coolant Piping Loop 1	20910	N/A
13	Reactor Coolant Piping Loop 2	20911	N/A
14	Reactor Coolant Piping Loop 3	20912	N/A
15	Reactor Coolant Piping Loop 4	20913	N/A
16	Pressurizer Surge Line	20918	20993 Sh 16
17	Pressurizer Spray Line from Loop 1A	20919	20993 Sh 17
18	Pressurizer Spray Line from Loop 1B	20920	20993 Sh 18
19	Pressurizer Spray Line Combined	20921	20993 Sh 19
20	Pressurizer Safety Line	20922	20993 Sh 20
21	Pressurizer Relief Line	20923	20993 Sh 21
22	Safety Injection Loop A (10")	20924	20993 Sh 22
23	Safety Injection Loop B (10")	20925	20993 Sh 23
24	Safety Injection Loop B (6")	20926	20993 Sh 24
25	Safety Injection Loop C (10")	20927	20993 Sh 25
26	Safety Injection Loop D (10")	20928	20993 Sh 26
27	Residual Heat Removal & 6" HPSI Combined (Loop A)	20929	20993 Sh 27
28	Residual Heat Removal & 6" HPSI Combined (Loop D)	20930	20993 Sh 28
29	Loop Bypass Loop A (8"/2")	20931	20993 Sh 29
30	Loop Bypass Loop B (8"/2")	20932	20993 Sh 30
31	Loop Bypass Loop C (8"/2")	20933	20993 Sh 31
32	Loop Bypass Loop D (8"/2")	20934	20993 Sh 32
33	Loop Bypass Loop A (3"/2")	20935	20993 Sh 33

TABLE 2.6
EXAMINATION ZONE LISTING

Zone No.	Class 1 Systems	Drawing No. NDE	Hanger
34	Loop Bypass Loop B (3"/2")	20936	20993 Sh 34
35	Loop Bypass Loop C (3"/2")	20937	20993 Sh 35
36	Loop Bypass Loop D (3"/2")	20938	20993 Sh 36
37	HPSI Loop A (1-1/2")	20939	20993 Sh 37
38	HPSI Loop B (1-1/2")	20940	20993 Sh 38
39	Int. Head Safety Injection (SIH)(6")	20941	20993 Sh 39
40	HPSI Loop C (1-1/2")	20942	20993 Sh 40
41	HPSI Loop D (1-1/2")	20943	20993 Sh 41
42	Reactor Drain Loop A	20944	20993 Sh 42
43	Reactor Drain Loop B	20945	20993 Sh 43
44	Reactor Drain Loop C	20946	20993 Sh 44
45	Reactor Drain Loop D	20947	20993 Sh 45
46	Reactor Drain Combined	20948	20993 Sh 46
47	Chemical & Volume Control Loop A (2" EL)	20949	20993 Sh 47
48	Chemical & Volume Control Loop A (3" CL)	20950	20993 Sh 48
49	Chemical & Volume Control Loop A (2" EL)	20951	20993 Sh 49
50	Chemical & Volume Control Loop C (2" EL)	20952	20993 Sh 50
51	Chemical & Volume Control Loop C (3" EL)	20953	20993 Sh 51
52	Chemical & Volume Control Loop D (2" EL)	20954	20993 Sh 52
999	Pressure Test (See Section 5.0 for description)		

TABLE 2.6
EXAMINATION ZONE LISTING (continued)

Zone No.	Class 2 Systems	Drawing No. NDE	Hanger
53	Steam Generator A Secondary Side	20955	20993 Sh 53
54	Steam Generator B Secondary Side	20956	20993 Sh 54
55	Steam Generator C Secondary Side	20957	20993 Sh 55
56	Steam Generator D Secondary Side	20958	20993 Sh 56
57	Main Steam Loop A Inside Containment	20959	20993 Sh 57
58	Main Steam Loop B Inside Containment	20960	20993 Sh 58
59	Main Steam Loop C Inside Containment	20961	20993 Sh 59
60	Main Steam Loop D Inside Containment	20962	20993 Sh 60
61	Main Steam Loop A Inside Containment	20963	20993 Sh 61
62	Main Steam Loop B Inside Containment	20964	20993 Sh 62
63	Main Steam Loop C Inside Containment	20965	20993 Sh 63
64	Main Steam Loop D Inside Containment	20966	20993 Sh 64
65	Main & Aux Feedwater Loop A Inside Containment	20963	20993 Sh 65
66	Main & Aux Feedwater Loop B Inside Containment	20964	20993 Sh 66
67	Main & Aux Feedwater Loop C Inside Containment	20965	20993 Sh 67
68	Main & Aux Feedwater Loop D Inside Containment	20966	20993 Sh 68
69	Main & Aux Feedwater Loop A Outside Containment	20979	20993 Sh 69
70	Main & Aux Feedwater Loop B Outside Containment	20980	20993 Sh 70
71	Main & Aux Feedwater Loop C Outside Containment	20981	20993 Sh 71
72	Main & Aux Feedwater Loop D Outside Containment	20982	20993 Sh 72
73	Residual Heat Removal Heat Exchanger "A"	20983	20993 Sh 73

TABLE 2.6
EXAMINATION ZONE LISTING (continued)

Zone No.	Class 2 Systems	Drawing No. NDE	Hanger
74	Residual Heat Removal Heat Exchanger "B"	20984	20993 Sh 74
75	Safety Injection Tank A to Loop A	20967	20993 Sh 75
76	Safety Injection Tank B to Loop B	20968	20993 Sh 76
77	Safety Injection Tank C to Loop C	20969	20993 Sh 77
78	Safety Injection Tank D to Loop D	20970	20993 Sh 78
79	Safety Inject. Penetration 93 to Loop A, B	20971	20993 Sh 79
80	Safety Inject. Penetration 94 to Loop C, D	20972	20993 Sh 80
81	Safety Inject. Penetration 95 to Loop B, D	20973	20993 Sh 81
82	Combined RHR to Loops A, D	20974	20993 Sh 82
83	RHR Pump 1A to Heat Exchanger	20860	20993 Sh 83
84	RHR Pump 1B to Heat Exchanger	20861	20993 Sh 84
85	RHR Exchanger A Discharge Header	20862	20993 Sh 85
86	RHR Train B	20863	20993 Sh 86
87	Low Pressure Safety Injection	20864	20993 Sh 87
88	Low Pressure Safety Injection	20865	20993 Sh 88
89	Low Pressure Safety Injection	20866	20993 Sh 89
90	HPSI 8" & 6" Pumps P1A to P1B	20867	20993 Sh 90
91	Low Pressure Safety Injection	20868	20993 Sh 91
92	CVCS From Charging Pumps B & C	20869	20993 Sh 92
93	CVCS From Charging Pump A	20870	20993 Sh 93
94	HPSI to Charging Pumps	20871	20993 Sh 94
95	Quench Spray From Chemical Refuel Tank	20872	20993 Sh 95
96	Quench Spray From Storage Tank to Pump	20873	20993 Sh 96
97	Quench Spray From Pumps to Penetration	20874	20993 Sh 97
98	Quench Spray Headers Inside Containment	20875	20993 Sh 98
99	Recirculation Spray System D	20876	20993 Sh 99
100	Recirculation Spray System B	20877	20993 Sh 100
101	Recirculation Spray System C	20878	20993 Sh 101

TABLE 2.6
EXAMINATION ZONE LISTING (continued)

Zone No.	Class 2 Systems	Drawing No. NDE	Hanger
102	Recirculation Spray System A	20879	20993 Sh 102
103	Containment Sump to Valve V-10	20880	N/A
104	Containment Sump to Valve V-7	20881	N/A
105	Containment Sump to Valve V-4	20882	N/A
106	Containment Sump to Valve V-1	20883	N/A
107	CMS	20997	N/A
108	HCS	20998	N/A
109	CVS	20999	N/A
110	Deleted		
111	Low Pressure Safety Inject. To Zone 092	20888	N/A
112	Low Pressure Safety Inject. from Zone 080	20889	20993 Sh 112
113	Low Pressure Safety Inject. from Zone 082	20890	20993 Sh 113
114	RHR from Heat Exchanger "A"	20891	N/A
115	RSS to LPSI	20892	N/A
116	RSS to RHR	20893	N/A
117	RHR Penetration 092 to P1B	20894	20993 Sh 117
118	RHR Penetration 091 to P1A	20895	20993 Sh 118
119	Low Pressure Safety Inject. from 3QSS-TK-1	20896	N/A
120	Steam Generator Blowdown	20994	N/A
121	Deleted		
122	Main Steam Supply to Steam-Driven	20996	N/A
	Auxiliary Feed Pump Turbine		
123	Chemical & Volume Control	20985	N/A
124	Chemical & Volume Control	20986	N/A
125	Chemical & Volume Control	20987	N/A
126	Chemical & Volume Control	20988	N/A
127	Intermediate Safety Inject. Outside	20047	N/A
	Containment Penetrations		
128	HPSI to Penetration No. 51	20990	N/A
129	CHS Discharge from Pumps P&B & P&C	20991	N/A
129A	CHS Alt. Min-Flow Lines from P3B and P3C	20992 Sh 2 & 3	20993 Sh 185
130	CHS Discharge from Pump P3A	20992	N/A

TABLE 2.6
EXAMINATION ZONE LISTING (continued)

Zone No.	Class 2 Systems	Drawing No. NDE	Hanger
130A	CHS Alt. Min-Flow Lines from P3A	20992 Sh 1	20993 Sh 184
131	CHS Discharge Cross Connect	20353	N/A
132	CHS Discharge Outside CTMT	20352	N/A
133	CHS Discharge to Penetration No. 26	20354	N/A
999	See Section 5.0 for description		
134	FWA-TK1 to FQA P1A (Suction)		20993 Sh 134
135	FWA from Penetration No. 81		20993 Sh 135
136	FWA Pump 1B to Valve No. 22		20993 Sh 136
137	FWA-TK1 to Valve 995		20993 Sh 137
138	FWA-TK1 to FQA Pump 2 (Suction)		20993 Sh 138
139	Valve 915 (FWA) to Zone 116		20993 Sh 139
140	FWA Pump 1A to Wall Penetration Zone 142		20993 Sh 140
141	FWA from Valve 13 to Valve 10		20993 Sh 141
142	FWA from Valve 41 to CTMT Penetration No. 80		20993 Sh 142
143	FWA from Valve 33 to Valve 36		20993 Sh 143
144	FWA from Valve 24 to CTMT Penetration No. 82		20993 Sh 144
145	FWA TK-1 to FWA Pump 1B (Suction)		20993 Sh 145
146	FWA Pump 2 (Discharge) to CTMT Penetration No. 79		20993 Sh 146
147	FWA from Valve 984 to FWA-TK-1		20993 Sh 147
148	FWA from Valve 986 to FWA-TK-1		20993 Sh 148
149	FWA CTMT Penetration 79 and 80		20993 Sh 149
150	FWA CTMT Penetration No. 81 to CL.3 Break		20993 Sh 150
151	FWA CTMT Penetration No. 82 to CL.2 Break		20993 Sh 151
152	SFC E1A and E1B to Spent Fuel Pool		20993 Sh 152
153	SFC Discharge Pumps P1A & P1B to SFC E1A & E1B		20993 Sh 153
154	Spent Fuel Pool to Pumps 1A & 1B		20993 Sh 154
155	CCP from Zone 158 to SFC-E1C		20993 Sh 155

TABLE 2.6
EXAMINATION ZONE LISTING (continued)

Zone No.	Class 2 Systems	Drawing No. NDE	Hanger
156	RHS-E1B to SFC-E1B (CCP)		20993 Sh 156
157	CCP Penetration 42 to CCP P1B (Suction)		20993 Sh 157
158	CCP Heat Exchanger 1B to Penetration No. 40		20993 Sh 158
159	Pump E1B to SFC-E1B Discharge (CCP)		20993 Sh 159
160	CCP 1A Suction		20993 Sh 160
161	SFC-E1A Discharge to Valve 107 (CCP)		20993 Sh 161
162	CCP Penetration to System CL. Break		20993 Sh 162
163	3CCP-E1A to 3CCP-E1C Discharge		20993 Sh 163
164	SFC-E1A Suction to RHS-E1A (Split System)		20993 Sh 164
165	CCP-P1A Discharge to Pump E1A (Suction)		20993 Sh 165
166	Heat Exchanger CHS-E2 (Suction) from V-17		20993 Sh 166
167	CCP Penetration 41 to CHS-E2 Pump		20993 Sh 167
168	CCP Penetration 40 to Valve 958		20993 Sh 168
169	SWP from EGS No. E2A and E2B Pumps to Yard		20993 Sh 169
170	SWP Section to E1A and E1B		20993 Sh 170
171	SWP from EGS No. E2A and E2B Pumps to Yard		20993 Sh 171
172	SWP from Zone 173 to Yard		20993 Sh 172
173	3HVK Chiller 1A to SWP-P2A (Suction)		20993 Sh 173
174	SWP Valve 9 Control Building Yard		20993 Sh 174
175	SWP Discharge from P2A and P2B to Chill 1A and 1B		20993 Sh 175
176	Pumps E1A and E1C Discharge to Yard		20993 Sh 176
177	RSS-E1B and E1D to Yard		20993 Sh 177
178	Yard to RSS-E1B and E1D		20993 Sh 178
179	RSS-E1A and E1C to Valve 24 and Valve 304		20993 Sh 179

TABLE 2.6
EXAMINATION ZONE LISTING (continued)

Zone No.	Class 2 Systems	Drawing No. NDE	Hanger
180	Comp. Cooling HX-1A, 1B, & 1C (Suction)		20993 Sh 180
181	SWP Strainers 1B & 1D to Yard		20993 Sh 181
182	SWP Strainers 1A & 1C to Yard		20993 Sh 182
183	CCP-HX 1A, 1B & 1C to Circ. Water Discharge Tunnel		20993 Sh 183
999	Pressure Test (See Section 5.0 for description)		

3. CODE CASES

Code Cases approved for use in revisions to Regulatory Guide 1.147 that are issued during the inspection interval may be used for the duration of the inspection interval without specific written NRC approval subject to the limitations provided in the Regulatory Guide.

Code Cases that are not approved for use in revisions to Regulatory Guide 1.147 that are issued during the inspection interval shall require specific written NRC approval prior to use. Requests for approval to use Code Cases not listed in Regulatory Guide 1.147 shall be submitted to the NRC in accordance with 10 CFR 50.55a(a)(3)(i) or (ii).

Code Cases shown in Table 3.1 form an integral part of this program and are identified with either the revision of Regulatory Guide 1.147 in which they were approved for use, or the NRC SER letter that provided approval to use the Code Case.

As Code Cases are applied, they are referenced in the appropriate Sections of this manual.

TABLE 3.1
CODE CASE SUMMARY TABLE

Code Case	Title	Documentation / Notes
N-432-1	Repair Welding Using Automatic or Machine Gas Tungsten-Arc Welding (GTAW) Temper Bead Technique	Code Case N-432-1 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-460	Alternative Examination Coverage for Class 1 and Class 2 Welds	Code Case N-460 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-504-3	Alternative Rules for Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping	Code Case N-504-3 is listed as conditionally acceptable in Rev. 15 of Regulatory Guide 1.147.
N-513-2	Evaluation Criteria For Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping	Code Case N-513-2 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-526	Alternative Requirements for Successive Inspections of Class 1 and 2 Vessels	Code Case N-526 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.

TABLE 3.1
CODE CASE SUMMARY TABLE

Code Case	Title	Documentation / Notes
N-532-4	Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as Requested by IWA-4000 and IWA-6000	Code Case N-532-4 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-537	Location of Ultrasonic Depth-Sizing Flaws	Code Case N-537 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-545	Alternative Requirements for Conduct of Performance Demonstration Detection Test of Reactor Vessel	Code Case N-545 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-552	Alternative Methods-Qualification For Nozzle Inside radius Section From Outside Surface	Code Case N-552 is listed as conditionally acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-566-2	Corrective Action for Leakage Identified at Bolted Connections	Code Case N-566-2 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-586-1	Alternative Additional Examination Requirements for Class 1, 2, and 3 Piping, Components, and Supports	Code Case N-586-1 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-600	Transfer of Welder, Welding Operator, Brazer and Brazing Operator Qualifications Between Owners	Code Case N-600 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-613-1	Ultrasonic Examination of Penetration Nozzles in Vessels, Examination Category B-D, Item Nos. B3.10 and B3.90, Reactor Nozzle to Vessel Welds, Figs. IWB-2500-7(a), (b), and (c).	Code Case N-613-1 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-624	Successive Inspections	Code Case N-624 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-638-1	Similar and Dissimilar Metal Welding Using Ambient Temperature Machine Gas Tungsten-Arc Welding (GTAW) Temper Bead Technique	Code Case N-638-1 is listed as conditionally acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147

TABLE 3.1
CODE CASE SUMMARY TABLE

Code Case	Title	Documentation / Notes
N-639	Alternative Calibration Block Material	Code Case N-639 is listed as conditionally acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147
N-648-1	Alternative Requirements for Inner Radius Examination of Class 1 Reactor Vessel Nozzles	Code Case N-648-1 is listed as conditionally acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-651	Ferritic and Dissimilar Metal Welding Using SMAW Temper Bead Technique Without Removing the Weld Bead Crown of the First Layer	Code Case N-651 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-658	Qualification Requirements for Ultrasonic Examination of Wrought Austenitic Piping Welds	Code Case N-658 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-661	Alternative Requirements for Wall Thickness Restoration For Class 2 and 3 Carbon Steel Raw Water Service	Code Case N-661 is listed as conditionally acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-663	Alternative Requirements for Class 1 and 2 Surface Examinations	Code Case N-663 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147. (See Note 1)
N-683	Method for Determining Maximum Allowable False Calls When Performing Single Sided Access Performance Demonstration in Accordance With Appendix VIII, Supplements 4 and 6	Code Case N-683 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-686	Alternative Requirements for Visual Examinations, VT-1, VT-2, and VT-3	Code Case N-686 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-695	Qualification Requirements for Dissimilar Metal Piping Welds	Code Case N-695 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.
N-696	Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface	Code Case N-696 is listed as acceptable to the NRC in Rev. 15 of Regulatory Guide 1.147.

TABLE 3.1
CODE CASE SUMMARY TABLE

Code Case	Title	Documentation / Notes
N-722	Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials	The use of Code Case N-722 is mandated by 10 CFR 50.55a(g)(6)(ii)(E). Additional conditions apply.
N-729-1	Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial Penetration Welds	The use of Code Case N-729-1 is mandated by 10 CFR 50.55a(g)(6)(ii)(D). Additional conditions apply.
N-731	Alternative Class 1 System Leakage Test Pressure Requirements	See Relief Request IR-3-09
N-770	Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials	See Relief Request IR-3-05 (See Note 2)

NOTES

1) The criteria of Code Case N-663 will be superseded by the Risk-Informed Inservice Inspection application performed on Class 1 piping. However, Code Case N-663 could be applied to Class 2 piping since it has not undergone a RI-ISI application. Application of Code Case N-663 involved an evaluation of Class 2 piping for susceptibility to external (OD) cracking. During the second interval, MPS3 implemented Code Case N-663 for Class 2 piping welds in Relief Request IR-2-36. For the third interval, DNC will implement Code Case N-663 for Class 2 components only.

2) Although Code Case N-770 had not been published as of Supplement 6 to the 2007 Code Cases, it had been approved by the Board of Nuclear Codes and Standards and is scheduled for publication. Per IR-3-05 DNC will implement the examination criteria of Code Case N-770 at MPS3 for the inservice inspection of the existing Pressurizer weld overlays that were originally applied during the second interval through Relief Requests IR-2-39 and IR-2-47.

4. EVALUATION CRITERIA AND CALIBRATION STANDARDS

4.1 Class 1 Acceptance Standards

Class 1 acceptance standards are listed in Table 4.1

4.2 Class 2 Acceptance Standards

Class 2 acceptance standards are listed in Table 4.2

4.3 Class 3 Acceptance Standards

Class 3 acceptance standards are listed in Table 4.3.

4.4 Acceptance Standards for Component Supports (Classes 1, 2, and 3)

Acceptance standards to verify component support structural integrity will be in accordance with IWF-3400.

4.5 Calibration Standards

Calibration blocks and standards are listed in Table 4.4. Calibration blocks for piping are located in the ISI calibration cage in the waste disposal building. Vessel calibration blocks are stored in the warehouse and need to be requisitioned prior to the outage.

4.6 Analytical Evaluation of Flaws

Flaws exceeding the size of allowable flaws defined in IWX-3500 may be evaluated in accordance with IWB-3600 to determine acceptability for continued service. Flaws which meet the acceptance criteria of IWB-3600 shall be re-examined during the next three inspection periods per IWB-2420(b). If the flaw indications remain essentially unchanged during the next three inspection periods, the component examination schedule may revert to the original schedule of successive inspections.

> NOTE: Per IWF-3122.3(b), when an inservice examination of a component support reveals conditions described in IWF-3410(a), **and** the component support has been analyzed and/or tested to substantiate its integrity for its intended service, and has been found to be acceptable, **and** corrective measures to restore the support to its original condition have been performed, **then successive support examinations are not required**.

4.7 Unanticipated Operating Events

IWB-3720 requires an engineering evaluation to be performed following an operating event outside the normal operating pressure and temperature limits defined in MPS3 Plant Technical Specifications. ASME Section XI, Appendix E, may be utilized to evaluate the event. The evaluation procedures are subject to acceptance by the regulatory authority.

TABLE 4.1
CLASS 1 ACCEPTANCE STANDARDS

Examination Category	Components and Parts Examined	Acceptance Standard
B-A	Welds in Reactor vessel	IWB-3510
B-B	Welds in other vessels	IWB-3510
B-D	Nozzle welds in vessels	IWB-3512
B-F	Rx vessel dissimilar metal welds	See Exam. Cat. R-A
B-G-1	Class 1 Bolting >2"	IWB-3515, IWB-3517
B-G-2	Class 1 Bolting ≤2"	IWB-3517
B-J	Welds in piping	See Exam. Cat. R-A
B-K	Welded attachments	IWB-3516
B-L-1	Welds in pump casings	IWB-3518
B-L-2	Pump casings	IWB-3519
B-M-1	Welds in valve bodies	IWB-3518
B-M-2	Valve bodies	IWB-3519
B-N-1	Reactor vessel interior	IWB-3520.2
B-N-2	Reactor vessel integrally welded core support structures	IWB-3520.1, IWB-3520.2
B-N-3	Reactor vessel removable core support structures	IWB-3520.2
B-O	Welds in CRD housings	IWB-3523
B-P	Pressure Retaining Components	IWB-3522
R-A	Risk Informed Piping Examinations	IWB-3142, IWB-3514 (will be addressed in the RI-ISI Application)

TABLE 4.2
CLASS 2 ACCEPTANCE STANDARDS

Examination Category	Components and Parts Examined	Acceptance Standard
C-A	Welds in pressure vessels	IWC-3510
C-B	Nozzle welds in vessels	IWC-3511
C-C	Welded attachments for Class 2 Pressure vessels, Piping, Pumps, and Valves	IWC-3512
C-D	Class 2 Bolting >2" in Diameter	IWC-3513
C-F-1	Welds in austenitic stainless steel or high alloy piping	IWC-3514 (IWB-3514)
C-F-2	Welds in carbon or low alloy steel piping	IWC-3514 (IWB-3514)
C-G	Welds in Pumps and Valves	IWC-3515 (IWB-3518)
C-H	Pressure Retaining Components	IWC-3516 (IWB-3522)

TABLE 4.3
CLASS 3 ACCEPTANCE STANDARDS

Examination Category	Components and Parts Examined	Acceptance Standard
D-A	Welded Attachments for Vessels, Piping, Pumps, and Valves	IWD-3000 (IWC-3500)
D-B	All Pressure Retaining Components	IWD-3000 (IWC-3500)

TABLE 4.4
CALIBRATION STANDARDS

Std. No.	Description	Heat Numbers	Use
UT-1	11" thick clad	HT No. C4068-2	RPV - (SA-533 GR B C1.1)
UT-2	9" thick clad	B9804-3	RPV
UT-3	7" thick clad	B9804-3	RPV Closure Head (SA-533 GR B C1.1)
UT-4	5" thick clad	C4372-2	S/G (SA-533 GR B C1.1) Primary Weld
UT-5	3" thick	HT No. C4068-2	RCP Safe Ends
UT-6	33" x 8" x 11"	HT No. 125J596VA1	RPV Flange Ligament Area (SA-508 C1.2)
UT-7	2 ½" thick	HT No. 5160C-1	Main Coolant piping (CCSS) (SA-351 GR CF8A)
UT-7A	2 ½" thick	HT No. 147895-1	Main Coolant piping (CCSS) (SA-351 GR CF8A)
UT-8	3 ½" thick	HT No. T11340	Steam Generator Secondary Side Welds (SA-533 GR A, C1.2)
UT-9	5" thick clad	HT No. B-9804-3	RPV Shell (SA-533 GR A, C1.4)
UT-10	3" thick clad	HT No. BZ66	Pressurizer Shell (SA-533 GR A, C1.2)
UT-12	¾" T	HT No. 894124W	Vertical Residual Heat Exchangers (SA-240 TP 304)
UT-15	4 ½" dia. ½" T	SB167	CRDM Tube Weld
UT-16	3" dia. 20" Long	HT No. L-3269-K3, K4	Main Coolant Valve Studs (SA-453 Condition B, GR 660) (SA-453, Condition B, GR 660) (NON-PDI)
UT-16A	3" dia. 20" Long	-	Main Coolant Valve Studs (SA-453 Condition B, GR 660) (SA-453, Condition B, GR 660)
UT-18	14" Sch. 160	HT No. 20873	Press Surge Line Safe End (SA-182 GR F316)
UT-19	6" Sch. 160	HT No. 78809	Press Relief and Safety Line Safe Ends (SA-182 GR F316)
UT-20	4" Sch. 160	HT No. 42018	Press Spray Line Safe End (SA-182 GR F316)
UT-21	4" Sch. 160	HT No. M9593	Class 1 Piping (SA-376 TP 316)

TABLE 4.4
CALIBRATION STANDARDS

Std. No.	Description	Heat Numbers	Use
UT-22	6" Sch. 160	HT No. 0631-29-2	Class 1 Piping (SA-376 TP 316)
UT-23	8" Sch. 160	HT No. M0035	Class 1 Piping (SA-376 TP 316)
UT-24	10" Sch. 160	HT No. 1091-5-1-2	Class 1 Piping (SA-376 TP 316)
UT-25	12" Sch. 160	HT No. 1081-44-1	Class 1 Piping (SA-376 TP 316)
UT-26	12" Sch. 160	HT No. 534982	Class 1 Piping (SA-376 TP 316)
UT-27	14" Sch. 160	HT No. 3-383	Class 1 Piping (SA-376 TP 316)
UT-28	4.5" dia.	HT No. 3P4028	RCP Studs (A-540-B24) (NON-PDI)
UT-28A	4.5" dia	-	RCP Studs (A-540-B24)
UT-29		HT No. A-0159-5	RCP Flywheel (A516 GR 70)
UT-31	32" 1.292" T	HT No. 65817	Main Steam Piping (SA-155, C1.1, GR KC-70)
UT-32	30" 1.250" T	HT No. 89626	Main Steam Piping (SA-155, C1.1, GR KC-70)
UT-33	6" Sch. 160	HT No. 12060	Auxiliary Feedwater Piping (SA-106, GRC)
UT-34	31.5" 2.0" T	HT No. 803P7323	Main Steam Piping (SA-155, C1.1, GR KC-70)
UT-35	20" Sch. 100	HT No. N37344	Main Feedwater Piping (SA-106, GR-B)
MP1-UT-35	10" Sch. 80	HT No. 39891	LPSI Outside Containment (Zone 88) (SA-240 TP 316)
UT-36	18" Sch. 100	HT No. 52510	Main Feedwater Piping (SA-106, GR-B)
UT-37	16" Sch. 100	HT No. N16677	Main Feedwater Piping (SA-106, GR-B)
UT-38	8" Sch. 100	HT No. 26737	Main Steam Piping (SA-106, GR-B Auxiliary Feedwater Piping)
UT-40	57.700" LG	HT No. 83289	RPV Stud 57.570" Long
UT-41	35" LG x 2 ½" dia.	HT No. 220690	MSIV Stud (NON-PDI)
UT-41A	35" LG x 2 ½" dia.	HT No. 220690	MSIV Stud
UT-LW-3	10" x 1 ½" T	-	SA-240 Type 304 Thin Walled Class 2 Piping (Retired)
UT-44	9" dia. X 6"	HT No. - n/s	Pressurizer Inner Radius

TABLE 4.4
CALIBRATION STANDARDS

Std. No.	Description	Heat Numbers	Use
UT-45	2.125" dia. x 9.25"	HT No.-90723	SA-193 Gr. B7 SIH pump Stud (NON-PDI) Replaced with UT-47
UT-46	8"x12"x14"	HT No. R4980	SG Feedwater Nozzle Inner Radius
UT-47	2.125" dia. x 9.25"	HT No.-90723	SA-193 Gr. B7 Stud. SIH Pump Casing Stud.
QA-6326	ASME Alternative Block	-	Carbon Steel piping welds
QA-6327	ASME Alternative Block	-	Carbon Steel piping welds
QA-6328	ASME Alternative Block	-	304 Stainless piping welds
QA-6329	ASME Alternative Block	-	304 Stainless piping welds
QA-6330	ASME Alternative Block	-	316 Stainless piping welds
QA-6331	ASME Alternative Block	-	316 Stainless piping welds
MP3-UT-49	8" Circ Scan Block	HT No. 727018/238363	Pressurizer – Safety, Spray and Relief Nozzle Weld Overlay
MP3-UT-50	8" Circ Scan Block	HT No. 727018/238363	Pressurizer – Safety, Spray and Relief Nozzle Weld Overlay
MP3-UT-51	16" Circ Scan Block	HT No. 727018/238363	Pressurizer - Surge Nozzle Weld Overlay
MP3-UT-52	16" Circ Scan Block	HT No. 727018/238363	Pressurizer – Surge Nozzle Weld Overlay

5. SYSTEM PRESSURE TESTS

5.1 General Requirements

Pressure retaining components within Class 1, Class 2 and Class 3 system boundaries are subject to system pressure tests in accordance with the following portions of ASME Section XI:

Classification	Applicable Code Requirements
General	IWA-5000
Class 1	IWB-2500-1 (Examination Category B-P) and IWB-5000.
Class 2	IWC-2500-1 (Examination Categories: C-B [Item No. C2.33] and C-H) and IWC-5000
Class 3	IWD-2500-1 Examination Category D-B and IWD-5000.

Table 5.1-1, System Pressure Test Schedule, lists each system within the scope of this program along with the required test type and schedule.

The Class 1, Class 2 and Class 3 boundaries shown on the applicable piping and instrumentation diagrams (P&IDs) shall be used in determining test boundaries.

When pressure testing is performed at normal operating conditions, the Operations department shall be responsible for verification that system conditions are normal. Generally, the normal operating conditions are satisfied when the system is operating in a normal alignment with system pump(s) pressurizing the system.

System pressure tests have been designated as Zone 999 in the ISI database (see Section 2.7) and are not shown on Zone boundary drawings.

ASME Section XI, Table IWA-5210-1, lists applicable references to determine the appropriate type of system pressure test and related test parameters for each Code Class system. Typical system pressure test parameters are: pressure (as determined by type of test), temperature, holding time, and test boundary. System hydrostatic pressure testing, if required, will be performed on a case-by-case basis in accordance with the applicable code of record and site procedure, EN 31090, Elevated Pressure Test.

Buried components require a pressure loss, change in flow, or unimpaired flow test in accordance with the requirements of IWA-5244. In some instances, it is impractical to perform pressure loss or change in flow tests on buried Class 2 and 3 piping segments bounded by butterfly valves. Relief Request Nos. IR-3-06 and IR-3-07 propose that a verification of unimpaired flow test be performed for these piping segments.

Records of the visual examination conducted during a system leakage test shall include the procedure documenting the system test condition and system pressure boundary. Any source of leakage or evidence of structural distress shall be itemized, and the location and corrective action documented.

Ferritic steel components shall meet the test temperature requirements specified by fracture prevention criteria or determined by DNC, as applicable. Austenitic steel components do no require test temperature restrictions.

TABLE 5.1-1
SYSTEM PRESSURE TEST SCHEDULE

System	Applicable P&IDs	Test Type and Schedule		
		Period 1	Period 2	Period 3
BDG Steam Generator Blowdown	EM-123A, EM-144A	Leakage	Leakage	Leakage
CCE Charging Pump Cooling	EM-105A	Leakage	Leakage	Leakage
CCI Safety Injection Pump Cooling	EM-114A	Leakage	Leakage	Leakage
CCP Reactor Plant Component Cooling Water	EM-121A, EM-121B	Leakage	Leakage	Leakage
CHS Boric Acid	EM-104A, EM-104C	Leakage	Leakage	Leakage
CHS Volume Control [1]	EM-102A, EM-102B, EM-102D, EM-102E, EM-102E, EM-102F, EM-103A, EM-104A, EM-112A, EM-113B, EM-144B, EM-144C	Leakage	Leakage	Leakage
EGF Emergency Diesel Fuel [2]	EM-117A	Leakage	Leakage	Leakage
FWA Auxiliary Feedwater	EM-130B, EM-130C, EM-130D, EM-131A	Leakage	Leakage	Leakage
FWA Auxiliary Feedwater (alternate supply from CST)	EM-120B	Leakage	Leakage	Leakage
FWS Feedwater	EM-130C, EM-130D	Leakage	Leakage	Leakage
HVK Control Building Chilled Water	EM-151D, EM-151E	Leakage	Leakage	Leakage
MSS Main Steam (supply to FWA turbine)	EM-123A	Leakage	Leakage	Leakage
MSS Main Steam (from S/Gs to MSIVs)	EM-123A, EM-123B, EM-123D, EM-130C, EM-130D, EM-145A	Leakage	Leakage	Leakage
QSS Quench Spray [3]	EM-115A	Leakage	Leakage	Leakage
QSS Refueling Water Storage Tank	EM-104A, EM-112A, EM-113A, EM-113B, EM-115A	Leakage	Leakage	Leakage

TABLE 5.1-1
SYSTEM PRESSURE TEST SCHEDULE

System	Applicable P&IDs	Test Type and Schedule		
		Period 1	Period 2	Period 3
RCS Reactor Coolant	EM-102A, EM-102B, EM-102C, EM-102D, EM-102E, EM-102F, EM-103A, EM-112A, EM-112B, EM-113A, EM-113B, EM-144B, EM-155A	Leakage[4]	Leakage[4]	Leakage[4]
RHS Residual Heat Removal	EM-112A, EM-112C, EM-144B	Leakage	Leakage	Leakage
RSS Containment Recirculation Spray[5]	EM-112C	Leakage	Leakage	Leakage
SFC Spent Fuel Pool Cooling and Purification	EM-111A	Leakage	Leakage	Leakage
SIH High Pressure Safety Injection	EM-104A, EM-112A, EM-112B, EM-113A, EM-113B	Leakage	Leakage	Leakage
SIL SIL Accumulators [6]	EM-112B, EM-144B	Leakage	Leakage	Leakage
SWP Service Water (SWP side of RSS heat exchangers)	EM-133B	Leakage	Leakage	Leakage
SWP Service Water (accessible piping and components)	EM-133A, EM-133B, EM-133D	Leakage	Leakage	Leakage
SWP Service Water (buried piping) [8]	EM-132A, EM-133A, EM-133B, EM-133D	Unimpaired Flow	Unimpaired Flow	Unimpaired Flow
Penetration 28 (DAS)	EM-106C	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 27 (DGS)	EM-107A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 59 (SFC)	EM-111A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 60 (SFC)	EM-111A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 99 (SIH)	EM-113A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 15 (PGS)	EM-119A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 70 (CCP)	EM-121A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 38 (CDS)	EM-122A	Leakage[7]	Leakage[7]	Leakage[7]

TABLE 5.1-1
SYSTEM PRESSURE TEST SCHEDULE

System	Applicable P&IDs	Test Type and Schedule		
		Period 1	Period 2	Period 3
Penetration 72 (CDS)	EM-122A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 45 (CDS)	EM-122A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 116 (CDS)	EM-122A	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 56 (FPW)	EM-146B	Leakage[7]	Leakage[7]	Leakage[7]
Penetration 12A (SSR)	EM-144B	Leakage	Leakage	Leakage
Penetration 12B (SSR)	EM-144B	Leakage	Leakage	Leakage
Penetration 13A (SSR)	EM-144B	Leakage	Leakage	Leakage
Penetration 13D (SSR)	EM-146B	Leakage	Leakage	Leakage
Penetration 115 (SSP)	EM-155A	Leakage	Leakage	Leakage
Penetration 120 (SSP)	EM-155A	Leakage	Leakage	Leakage

Note 1 The purification and boron thermal regeneration sub-systems of CHS are exempt from pressure testing because they are not in the scope of Table IWD-2500-1, Examination Categories D-A, D-B, and D-C.
Note 2 The emergency diesel fuel system is included in the pressure test program per Technical Specification Amendment No. 110.
Note 3 The open-ended portion of QSS spray header is exempt from pressure testing per IWC-5222(b).
Note 4 Leakage test of the RCS shall be performed each refueling outage.
Note 5 The open-ended portion of RSS spray header is exempt from pressure testing per IWC-5222(b).
Note 6 The nitrogen supply to SIL accumulator isolation valves is exempt from pressure testing because it is an air system which is not required to be Class 2 per Regulatory Guide 1.26.
Note 7 Exempt from pressure testing per IWA-5110(c).
Note 8 Verification of unimpaired flow will be performed for buried Class 3 piping segments bounded by butterfly valves as defined in Relief Request No. IR-3-07.

5.2 Visual Examination Requirements

Personnel performing VT-2 examinations shall be certified in accordance with IWA-2300. The VT-2 visual examination is conducted to locate the evidence of leakage from pressure retaining components, or abnormal leakage from components with or without leakage collection systems. The requirements of IWA-5240 are applicable for performance of VT-2 visual examination.

5.3 Class 1 System Pressure Test Requirements

Class 1 systems are subject to system leakage tests per IWB-5220. Specific leakage testing requirements are as follows:

- Test Pressure shall be in accordance with IWB-5221:
  (a) The system leakage test shall be conducted at a pressure not less than the pressure corresponding to 100% rated reactor power.
  (b) The system test pressure and temperature shall be attained at a rate in accordance with the heat-up limitations specified for the system.
- Test Boundaries shall be in accordance with IWB-5222:
  (a) The pressure retaining boundary during the system leakage test shall correspond to the reactor coolant boundary, with all valves in the position required for normal reactor operation startup. The visual examination shall, however, extend to and include the second closed valve at the boundary extremity.
  (b) The pressure retaining boundary during the system leakage test conducted at or near the end of each inspection interval shall extend to all Class 1 pressure retaining components within the system boundary. For some piping segments it is impractical to extend the Class 1 pressure testing boundaries during this system leakage test. The applicable piping segments and proposed alternatives for conducting the system pressure tests are addressed in Relief Request No. IR-3-09.
- Test Temperature shall be in accordance with IWB-5240:
  (a) The minimum test temperature for either the system leakage or system hydrostatic test shall not be lower than the minimum temperature for the associated pressure specified in the plant Technical Specifications.
  (b) The system test temperature shall be modified as required by the results obtained from each set of material surveillance specimens withdrawn from the reactor vessel during the service lifetime.
  (c) For tests of systems or portions of systems constructed entirely of austenitic steel, test temperature limitations are not required to meet fracture prevention criteria. In cases where the components of the

system are constructed of ferritic and austenitic steels that are nonisolable from each other during a system leakage or system hydrostatic test, the test temperature shall be in accordance with IWB-5230(a).

Refer to Table 5.1-1 for information related to system pressure testing of Class 1 components.

5.4 Class 2 and Class 3 System Pressure Test Requirements

Class 2 and Class 3 systems are subject to system leakage tests per IWC-5220 and IWD-5220, respectively. Specific leakage testing requirements are as follows:

- Test Pressure shall be in accordance with IWC-5221 and IWD-5221, respectively.
  (a) The system leakage test shall be conducted at the system pressure obtained while the system, or portion of the system, is in service performing its normal operating function or at the system pressure developed during a test conducted to verify system operability (e.g., to demonstrate system safety function or satisfy technical specification surveillance requirements).
- Test Boundaries shall be in accordance with IWC-5222 and IWD-5222, respectively.
  (a) The pressure retaining boundary includes only those portions of the system required to operate or support the safety function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required.
  (b) Items outside the boundaries of (a), and open ended discharge piping, are excluded from the examination requirements.
- Test Temperature shall be in accordance with IWC-5240 and IWD-5221, respectively.
  (a) In systems containing ferritic steel components for which fracture toughness requirements were neither specified nor required in the construction of the components, the system test temperature shall be determined by DNC.
  (c) No limit on system test temperature is required for systems comprised of components constructed entirely of austenitic steel materials.

Refer to Table 5.1-1 for information related to system pressure testing of Class 2 and Class 3 components.

5.5 Repair and Replacement Pressure Test Requirements

The MPS3 repair and replacement program is performed in accordance with Dominion Fleet Repair Replacement Program Procedure ER-AA-RRM-100. System pressure tests following repair and replacement activities are in accordance with IWA-5214 and IWA-4540.

5.6 Implementing Instructions

System pressure tests are performed in accordance with plant procedures U3-24-ISI-FAP02.3, ASME Section XI Pressure Test Program and EN 31090, Elevated Pressure Test, or other plant approved procedures or approved work orders.

The procedure or work order shall include the following:

- a drawing or description of the test boundary
- test method and techniques
- test pressure and temperature
- holding time
- method for documentation

The individual responsible for test performance shall ensure the following, as required:

- certification of test personnel
- preparation of pressurizing equipment
- calibration of test equipment
- preparation of components/systems

5.7 Corrective Measures

The sources of leakage detected during the performance of a system pressure test shall be located and evaluated for corrective measures as follows:

- buried components with leakage losses in excess of limits acceptable for continued service shall be repaired or replaced
- if leakage occurs at a bolted connection, the bolting shall be evaluated for joint integrity in accordance with the requirements of Code Case N-566-2

- repairs or replacements of components shall be performed in accordance with Dominion Fleet Repair Replacement Program Procedure ER-AA-RRM-100

6. REPAIR/REPLACEMENT ACTIVITIES

Repair/replacement activities associated with pressure retaining components and their supports shall be performed in accordance with Dominion Fleet Repair Replacement Program Procedure ER-AA-RRM-100.

6.1 Establishment of a Baseline

A preservice examination following repair/replacement activities shall be performed prior to the return of the system to operation to establish a baseline and to provide data on initial conditions supplementing comparison with subsequent examinations. The preservice examination of the item(s) used for the replacement or repair, including any applicable joints connecting the item to the system shall be made in accordance with IWX-2200. This examination shall therefore make use of the same methods, techniques, and types of equipment as those which are planned to be used later on.

Shop and field examinations performed during construction may form part of the baseline examinations where examination after final installation and testing is not practical, provided that:

1. Such examinations are conducted under similar conditions and with equipment and techniques equivalent to those that are planned to be employed during subsequent inservice examinations.
2. Examinations conducted before a hydrostatic (or pneumatic) pressure test is followed by a confirmatory examination after the test on a sample of inspection areas to demonstrate that no significant change has occurred.
3. In the case of components classified as pressure vessels only, examinations are performed after the hydrostatic (or pneumatic) test.
4. The shop and field examination records are documented and identified in a form consistent with this manual and the planned records of subsequent inservice inspections.

When improvements are made in the methods, techniques, or new equipment is used in the inservice inspection program, a new baseline shall be established. The new baseline shall be developed for a particular component or portion of a component when the next scheduled examination of the component occurs. To the extent feasible, a correlation between the new and previous baseline shall be established using calibration data and component examination data.

7. RECORDS AND REPORTS

DNC will maintain adequate inspection, examination, test, flaw evaluation, and repair/replacement activity records such as radiographs, diagrams, drawings, calculations, examination and test data, description of procedures used, and evidence of personnel qualifications in accordance with IWA-1400(k) and IWA-6000.

DNC will retain all inspection, examination, test, and repair and replacement records for the service lifetime of the component or system in accordance with IWA-1400(l).

7.1 Preparation

7.1.1 Plans and Schedules

DNC will prepare plans and schedules for inservice examinations and tests to meet the requirements of IWA-6000.

7.1.2 Examinations

7.1.2.1 Analytical Evaluations

Analytical evaluations for acceptance of flaws found by volumetric, surface or visual examinations shall be prepared in accordance with IWA-6340(e), IWB-3132.3, IWB-3142.4, IWC-3122.3, or IWC-3132.3.

7.1.2.2 Summary Reports

Inservice inspection summary reports will be prepared at the completion of each inspection conducted during a refueling outage. The summary report shall contain the information required by Code Case N-532-4.

7.1.3 Tests

DNC will prepare records of visual examinations conducted during a system leakage test as required by IWA-5300

7.1.4 Repair/Replacement Activities

Reports and Records required by Code Case N-532-4 shall be prepared by DNC under Dominion Fleet Repair Replacement Program Procedure ER-AA-RRM-100.

7.1.5 Unresolved Indications

Unresolved Indications will be reported in accordance with MP-24-ISI-FAP01

7.2 **Submittal**

7.2.1 Plans and Reports

In accordance with IWA-1400(c), DNC will file with the enforcement and regulatory authorities plans and reports for inservice examinations and tests prepared as described in 7.1.1.

7.2.2 Inservice Inspection Summary Reports

In accordance with Code Case N-532-4, at the completion of the inservice inspection conducted during each refueling outage, DNC shall file with the enforcement and regulatory authorities an inservice inspection summary report prepared as described in 7.1.2.2. This report shall be submitted within 90 days following the completion of each refuel outage

7.2.3 Analytical Evaluations

In accordance with IWB-3134(b), IWB-3144(b), IWC-3125(b), and IWC-3134(b), DNC shall submit to the regulatory authority analytical evaluations of examination reports prepared as described in 7.1.2.1.

7.3 **Retention**

7.3.1 Inspection Records and Reports

DNC shall retain inspection records and reports in accordance with Code Case N-532-4, and the Dominion Quality Assurance Topical Report.

7.3.2 Items Subject to Review by Authorities

DNC shall retain records which are subject to review by enforcement and regulatory authorities in accordance with the following Articles:

IWA-4150 Repair/Replacement plan required by IWA-4150(c).

IWB-3134 Repair program and reexamination results for flaws found by volumetric and surface examinations and accepted by repair in Class 1 components.

IWB-3144 Repair program and reexamination results for flaws found by visual examinations and accepted by repair in Class 1 components.

IWC-3125 Repair program and reexamination results for flaws found by volumetric and surface examinations and accepted by repair in Class 2 components.

IWC-3134 Repair program and reexamination results for flaws found by visual examinations and accepted by repair in Class 2 components.

8. COMMITMENTS

This Program addresses the requirements of the ASME Boiler and Pressure Vessel Code, Section XI, 2004 Edition. In addition to meeting those requirements, the Program also addresses examinations that are performed to specific approved Code Cases, and Augmented Examinations identified in regulatory commitments to the NRC. DNC will document those examinations performed in lieu of the code (Code Case), and those exams performed in addition to the code (NRC Commitments).

8.1 Tracking/Logging of Correspondence

A review was performed July, 1996 on the first interval ISI Program in accordance with 10 CFR 50.54. A search was performed of all correspondences that might be related to meeting regulatory commitments made regarding the ISI Program. A MPS3 ISI commitment/correspondence Tracking File of correspondence and/or regulatory commitments prior to July, 1996 was created. Correspondence after July, 1996 relevant to the ISI Program shall be filed in this Tracking File. In addition, a summary of this Correspondence shall be maintained in the MPS3 ISI commitment/correspondence Tracking Log, Table 8.1.

8.2 Code Cases

Section 3 of this document provides guidance in the application of Code Cases. Upon the decision to apply a specific Code Case, if NRC approval is required a copy of all correspondence leading to approval shall be placed in the MPS3 ISI commitment/correspondence Tracking File and a summary added to Table 8.1.

8.3 Relief Requests

Section 9 of this document provides guidance in the utilization and submittal of Relief Requests.

Upon submittal of a Relief Request to the NRC, a copy of the correspondence package shall be placed in the MPS3 ISI commitment/correspondence Tracking File and a summary added to Table 8.1.

Once a response is received from the NRC, a copy of the correspondence shall be placed into the MPS3 ISI commitment/correspondence Tracking File and a summary added to Table 8.1.

8.4 Commitment / Correspondence Tracking Log

Augmented Examinations that are performed outside of the scope of Section XI requirements shall be referred to as Augmented Examinations. These Augmented Examinations might come at the direction of the regulatory authority, or might be a result of developing industry issues.

All correspondence leading to the addition of Augmented Examinations shall be placed in the MPS3 ISI commitment/correspondence Tracking File and a summary added to Table 8.11.

All correspondence with the NRC leading to the commitment of performing Augmented Examinations shall be placed in the MPS3 ISI Commitment / Correspondence Tracking File and a summary added to Table 8.1.

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG

File No.	Date	Orig.	Commitment	Compliance Verification
DJ720001	04/26/82	NU	Augmented ISI on aux feed pump steam line normally pressurized between cont. and first down stream normally closed valve	These welds are included in the current interval augmented ISI Program.
DB54000	05/03/83	NRC	Confirm 100% UT of all welds on high energy lines between outboard isolation valve and last (outboard) restraint.	The ISI Program includes all BEA systems in FSAR S3.6, technical review team will verify boundaries.
DD41000	08/01/83	NU	NU confirmed conformance to Reg. Guide 1.150 rev. 1 for RPV ISI inspections.	RPV ISI verified to meet 1.150 for the first inspection interval.
DD41000	08/01/83	NU	NU states that only UT responses greater than 50 percent DAC will be recorded for data consistency.	Superseded by subsequent commitment.
DD41000	08/01/83	NU	NU confirms that high energy fluid system will receive Augmented ISI per requirements of SRP 6.6 par 11.7	Covered in other commitments.
DD41000	08/01/83	NU	NU states for MSS and FWA, the Augmented ISI extends from penetration inboard to first rigid restraint.	ISI Program for MS & FWA does not go up to first whip restraint, only inboard penetration weld is in augmented, URI to resolve.

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 2 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
CQ93000	03/01/84	NU	All pipe welds in BEA as per FSAR S3.6 will receive Augmented Exam, UT/MT on pipe >4", not on pipe <4".	The ISI Program included a MT for welds < 4" and UT/MT > 4".
CS67000	05/01/84	NU	Added compensatory measures to UT proc. to include higher sensitivity of 3/4 t SDH, record > 20% DAC	Superseded by subsequent commitment.
CU37000	06/18/84	NU	Revise UT proc for CS & SS to say "any indication of suspected flaw regardless of amplitude will be recorded."	NU-UT-2, and NU-LW-1 require recording of any suspected flaw regardless of amplitude.
CF90001	03/07/85	NU	The ISI Program for cast SS welds should select welds with best acoustical properties.	ISI Coordinator tries to select STATIC/CSS joints and uses 0 degree UT to avoid noisy CCSS
CG90000	05/07/85	NU	The ISI Program for cast SS welds will select welds with best access for UT of weld and volume.	ISI Coordinator selected sample based upon accessibility; and all CCSS welds are ground flush
CL610001	07/25/85	NRC	NU commitment to perform CCSS piping UT using the best available technology.	NU sponsored a round robin demonstration, technical paper and continues evaluation.
BG71000	03/21/88	NU	Four (4) rigid feedwater sys piping supports will be visually inspected during next outage of sufficient duration.	All piping supports on the FWS in cont. were inspected by 1991 as per ISI Program.

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 3 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
BG41000	08/05/88	NU	RR No. IR-6 only inspect one side of the pressurizer support skirt to shell weld (surface exam)	Exam done 1989, MT performed on outside of skirt, see work order No. M3-89-02275
BA62000	05/04/89	NU	Visual exam of RC pump casing pressure boundary surfaces will be performed if pump is disassembled, see IR-4	1987 done, for pump A reference data sheet No. 3-87-vt-216
BA62000	05/04/89	NU	Visual exam of bolting and flange surface if a RCP is disassembled (IR-4)	Commitment was to VT any pump flange when disassembled, UIR 808 tracked. Program updated with change No. 15 to show completion.
A07335 (RCR-19260)	07/25/89	NU	Perform additional weld inspection if leakage of sufficient rate to induce thermal stresses is detected in valves SIH*MV8801A/B	LLRT Procedure SP3612B.4-41 was revised to include statement to contact ISI Coordinator to perform additional weld exams if leakage exceeds limits. Subject welds were added to the ISI Program as Augmented - IEN88-08 exams.
AI350001	02/08/91	NRC	RR14 residual heat exchanger SH/FL UT accessible portion and PT inaccessible portion	Zone 074 of the ISI Program shows a UT and PT performed in 1989

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 4 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
A09339	02/08/91	NRC	NRC approved relief requests IR-2,IR-3, IR-4, IR-7,IR-8,IR-9, IR-10,IR-11, IR-13, IR-14	Verified relief requests incorporated into ISI Program
AK21000	04/30/91	NRC	ABB will include questionable and marginal indications in training and test samples.	ABB/AMDATA confirmed that marginal surface exam test samples are included in training.
AK21000	04/30/91	NRC	CES modify monitoring procedure to increase field observations	CES monitoring procedure has been modified many times to improve training and monitoring.
B13932	10/30/91	NU	Upgrade ISI Program for Class 2 components to ASME Section XI 83 Edition through Winter 85 Addenda (NRC, granted A10880, 3/3/93)	Confirmed both program and database are to the 83 Winter 85 Addenda Code for the first inspection interval.
AP41000	10/31/91	NU	Perform UT of RPV BF nozzle/SE weld with 45R1 on lower 2/3 and 65R1 on upper 1/3	SWRI used a SLIC 40 transducer for the exam, UIR No. 806 tracked completion. Revised IR-9 (Rev. 2) to reflect.
AD42000	06/01/92	NU	IR-1, rev 2, NU investigate tooling advances and determine if supplemental manual UT can be performed or a request for relief of inaccessible areas will be sent.	Welds 102-151, 101-154A,B,C&D have code coverage less than 90%. Relief request IR-26 accepted by NRC.

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 5 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
AD42000	06/01/92	NU	IR-9 NU will demo that OD cracks can be detected on safe end weld in lieu of pt.	G. Miemiec/SLS witnessed demo with NRC in attendance 3/95
AD42000	06/01/92	NU	IR-1 rev3 UT of accessible areas, in service hydro test and inservice leakage test	Leak test done after every outage. 10-year in accordance with Code Case N-498-1.
GB87000	02/11/93	NRC	Upgraded computer sys (ISI) will installed week of 01/17/93	Currently on-line
GB 87000	02/11/93	NRC	New Computer program will have option to review data sheets	UIR No. 857 tracked completion. First implementation scheduled for RFO-7.
A10880	03/03/93	NRC	NRC approved relief requests IR-1, IR-6,IR-9, IR-12, IR-18	Verified relief requests incorporated into ISI Program
A10880	03/03/93	NRC	NRC approved use of N-323, N-436-1, N-437,N-460, N-461	ISI coordinator verified these Code Cases were incorporated into ISI program.
JC380001	05/26/93	NU	NU will inspect RPV studs and MSIV studs to ASME code case N-307-1	Superseded by a subsequent commitment/correspondence
JC380001	05/26/93	NU	Will perform 7.5% sample UT of chemical and volume control and high pressure safety injection systems	7.5% in program. Exams completed in RFO6
A11306	11/05/93	NRC	Approved use of N-491 for the 1st Interval.	Included in ISI Program

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 6 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
JG020001	11/05/93	NU	Approves N-307-1 for RPV bolts, disapproves it for MSIV bolts	RPV bolting exam was done in 1995 at West in accordance with N-307-1
JG730001	02/04/94	NU	16 thin wall SS weld did not get full UT coverage relief request to follow	See JV910001, duplicate
JG730001	02/04/94	NU	4 integral attachment welds id not receive UT coverage relief request to follow	See JV910001, duplicate
JJ990001	06/17/94	NU	NU commits to performing UT of class 2 bolts using appendix VI 1983 in lieu of N-307-1	MSIV studs done to Appendix VI, SIH pump studs Completed in 1999 (RFO6)
JJ990001	06/17/94	NU	NU will update ISI program plan to incorporate code case N498 "alternate 10 hydro pressure test rules for Class 1 and 2 systems.	Included under section 5.7 of MP3 ISI Program, First Interval. Included in Section 5.0 of the MP3 ISI Program, Second Interval.
A11760	08/03/94	NRC	Approved use of N-498 for the 1st Interval.	This Code Case is now superseded in program by N-498-1
JO330001	12/16/94	NU	NU requests relief IR-19 from S/G steam nozzle IR & proposes to do visual exam during system leak test as per N-498	Completed as part of the system leak tests.
JO510001	12/23/94	NU	Tech Spec change (Amendment 110) will include augmented inspection of DG fuel oil system pressure test as per 1983 table IWD 2500-1	Test performed during 1995 outage under AWO M3-85-03733 for the first inspection interval. Scheduled for each period of the second interval.

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)

File No.	Date	Orig.	Commitment	Compliance Verification
A12085	01/18/95	NRC	NRC approved use of N-416-1 and N-498-1 for the 1st Interval.	Included in ISI Program
A12289	05/04/95	NRC	NRC approved relief request IR-19	Verified relief request incorporated into ISI Program
JV91001	06/30/95	NRC	NU commits to perform a top to bottom review of first 10 year interval	Performed by ISI Coordinator in 1995 and ESAR report MP3-PES-97-0015.
JV910001	06/30/95	NRC	NRC determined that the 16 SS pipe UTs and 4 integral attachments were counted but relief was never requested	B-K-1 resolved by IR-20 (01/12/96) DRM changed ISI Program for SS welds
JV910001	06/30/95	NRC	ISI Engineer will include all correspondence to/from NRC in Program Manual	Added to program with change 5 to include Correspondence/ Commitment log.
JV910001	06/30/95	NRC	Within 6 months after outage, ISI ENG will perform and document ASME code verifications	CEN 101B was upgraded to include this requirement in NOV. 95
JV910001	06/30/95	NRC	ISI Engineer will issue changes to the ISI program within six months after outage	CEN 101B was upgraded to include this requirement in NOV. 95. Additionally added to SP31129.
JV910001	06/30/95	NRC	NU will notify NRC if essential 100% for RPV UT coverage was not examined	Issued Relief Request IR-21 and IR-22 and IR-27.
JV910001	06/30/95	NRC	NRC note that large scale audits of the program maybe could have picked up these discrepancies	UIR No. 805 tracked completion.

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)

File No.	Date	Orig.	Commitment	Compliance Verification
A12790	04/05/96	NRC	Approved use of Code Case N-535 for the 1st Interval	Incorporated in ISI Program Manual
A12893	6/28/96	NRC	NRC approves Reliefs IR-20, IR-21, and IR-22.	Incorporated in ISI Program Manual
A13004	09/13/96	NRC	Approved use of Code Case N-546 for the 1st Interval	Incorporated in ISI Program Manual (Change 18)
B16368	04/24/97	NNECO	1) ISI Program will be revised to include guidance on ASME Section XI requirements for additional and successive exams. 2) ISI documents will be revised to include guidance on requirements for requesting relief IAW 10CFR50.55a	Incorporated in ISI Program Manual (Change 12)
A13313	5/30/97	NRC	Repair/Replacements performed after 9/9/96, on Containment to be performed in accordance with requirements of IWE and IWL of 1992 Edition and Addenda of Section XI.	Incorporated in ISI Program Manual (Change 13)
A13670	2/17/98	NRC	NRC approves Relief Request IR-26	Incorporated in ISI Program Manual
B17409	8/19/98	NNECO	NNECO withdraws Relief Requests IR-23, IR-24, AND IR-25.	ISI Program updated to reflect.
A13884	8/20/98	NRC	NRC approves Code Case N-389-1	Incorporated in ISI Program Manual.

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 9 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
B17355	7/14/98	NNECO	NNECO informed NRC of ISI Interval extension.	First Interval Closed Oct. 23, 1999.
B17871	9/23/98	NNECO	Request to use Code Case N-532 (IR-2-10)	ISI Manual updated.
A14053	2/22/99	NRC	NRC approves Relief Request IR-27	Incorporated in ISI Program Manual
	3/03/99	NRC	NRC approves T.S. amendment 167 for T.S. 4.7.10.	Incorporated into Tech. Specs.
B17752	4/7/99	NNECO	Submitted 2nd Interval ISI Program	In NRC review.
A14068	4/16/99	NRC	NRC approves T.S Amendment 169 for T.S. 4.4.10.	Incorporated into Tech. Specs. And ISI Program manual updated requirements.
B17598	4/22/99	NNECO	Request Relief to use the 1998 Edition of ASME Section XI for IWE/IWL. (RR-E1)(RR-L1)	In NRC Review.
A14092	5/11/99	NRC	NRC approves Relief Request IR-9 (Rev.2)	Incorporated in ISI Program Manual
B17867	9/17/99	NNECO	Submittal of Relief Request IR-28	Approved
B13883	9/27/99	NNECO	Submitted RFO6 Outage Summary Report.	N/A
A15133	11/3/99	NRC	NRC Approves Relief Request IR-28	Incorporated in ISI Program Manual
B17927	12/13/99	NNECO	Amended Relief Request for IWE/IWL to include the 1999 Add.	Retracted

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 10 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
B17885	2/14/00	NNECO	Request to use Code Case N-623 (IR-2-12)	Approved
B17985	2/11/00	NNECO	Retraction of the Request to use the 1999 Addenda for IWE/IWL.	N/A
B18005	2/25/00	NNECO	Clarify that the term "certified" is being replaced with "Trained and Qualified" for the IWE/IWL Program.	Containment Inservice Inspection Manual updated.
A15255	4/21/00	NRC	NRC approval granted to use 1998 Edition of Section XI for IWE/IWL.	Containment Inservice Inspection Manual has been updated to reflect the requirements of the 1998 Ed.
B18098	5/31/00	NNECO	Submittal of Relief Request IR-2-13 and IR-2-14,	Approved
B18135	5/31/00	NNECO	Submittal of Relief Request for temporary Non-Code repair of a Class 3 Service Water leak.	Approved
B18146	6/21/00	NNECO	Revised Request to use Code Case N-566 to N-566-1 (IR-2-06 Rev.1)	Approved
B18105	6/28/00	NNECO	Inform NRC of the Intent to suspend examination of Class 1 (B-J, B-F) piping examinations and begin RI-ISI exams in the Second Period of the Second Interval.	Approved
A15322	7/24/00	NRC	NRC SEVAL approval for the 2nd ten year inspection interval.	Incorporated into the ISI Program Manual

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 11 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
B18104	7/25/00	NNECO	Submittal of the Class 1, Risk Informed ISI Program.	Approved.
A15335	8/24/00	NRC	NRC approval granted to use Code Case N-532 (IR-2-10)	Incorporated.
B18202	8/25/00	NNECO	Submittal of Relief Requests IR-2-15, 16, 17, and 18 for Appendix VIII implementation.	Revised and resubmitted under B18253 dated 11/08/00
A15337	8/28/00	NRC	NRC Approval of Relief Request IR-2-12 (Code Case N-623)	Incorporated.
A15356	10/04/00	NRC	NRC Approval of Relief Request IR-2-13, IR-2-14 (Limited exam coverage).	Incorporated.
B18253	11/08/00	NNECO	Submittal of Revision to Relief Request IR-2-15, 2-16, 2-18 (Appendix VIII Implementation).	Approved
A15383	11/14/00	NRC	NRC approval of Relief Request RR-E2 for Containment ISI Program.	Incorporated.
B18269	11/16/00	NNECO	Response to NRC RAI concerning intent to suspend B-J & B-F exams under original submittal B18105.	N/A
A15384	11/27/00	NRC	Approval for Relief Request associated with temporary SWP Non-Code repair	N/A

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 12 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
A15423	1/26/01	NRC	SER for Appendix VIII Relief Requests IR-2-15, 2-17, and 2-18.	Incorporated
A15429	2/02/01	NRC	Approval to suspend examinations of Class 1 (B-J, B-F) welds for the 1st period.	AR 00010956-02 to track commitment to complete a min. of 50% of the Class 1 Risk Informed welds by the end of the 2nd period.
B18470	9/26/01	Dom	Response to request for additional information for the Risk-Informed ISI program.	N/A
B18490	9/28/01	Dom	Submittal of Relief Requests IR-2-21, 22, 23, 24, 25, 26	Approved
A15653	3/12/02	NRC	NRC SER approval for Class 1 Risk Informed ISI Program	Incorporated into the ISI Program
B18621	4/02/02	Dom	Millstone Power Station Response to NRC Bulletin 2002-01 (Rx vessel head degradation).	N/A
B18657	5/30/02	Dom	Submittal of revised relief Request IR-2-25 rev1, and IR-2-26 rev. 1 as a response for request for additional information via NRC telecon.	Approved
A15742	8/20/02	NRC	NRC SER approval for Relief Requests IR-2-21, 22, 23, 24, 25 rev. 1, and 26 rev.1.	Incorporated into the ISI program

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 13 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
B18790	10/18/02	Dom	Submittal of the first period inservice inspection summary report (OAR-1).	N/A
B18796	11/26/02	Dom	Submittal of Relief Request IR-2-27, for the one time use of a non-ASME certificate holder for fabrication of FW Sys. Components	Approved
B19000	11/17/03	Dom	Ninety day response to NRC Bulletin 2003-02	Completed (RFO9) inspection under AWO M3-03-06218
B19021	03/30/04	Dom	Request to use Code Case N-663	Approved S/N 04-315 (5/04/04)
S/N 04-315	05/13/04	NRC	NRC approval to use Code Case N-663	Incorporated into ISI Program
S/N 04-027	06/12/04	NRC	NRC approval of Relief Request IR-2-27	Incorporated into ISI Program
S/N 04-447	08/04/04	Dom	Submittal of 2nd period (RF08 & RF09) Owners Activity Report (OAR-1).	N/A
S/N 04-535	09/23/04	Dom	Request to use temporary Non-Code repair in Service Water Sys. Brazed joints to 3CCI*E1A	Approved S/N 05-066 (9/22/05)
S/N 04-717	11/17/04	Dom	NRC review / closeout of Millstone 90 day response to NRC Bulletin 2003-02	N/A

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 14 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
S/N 05-100	5/9/05	Dom	Request to use Non-Code temporary repair of SWP brazed joint. Relief Request IR-2-38	Withdrawn
S/N 05-343	6/20/05	Dom	Request to use later Edition and Addenda of ASME Section XI for repair and Replacement Program.	
S/N 05-708A	10/19/05	Dom	Request to use weld overlay on Pressurizer weld. Relief Request IR-2-39.	Approved S/N 06-064 (1/23/06)
S/N 05-789	12/15/05	Dom	NRC Bulletin 2004-01 Inspection of Alloy 600 PZR penetrations and steam space piping connections, 60 day response.	N/A
S/N 06-031	1/24/06	Dom	Submittal of 3R10 OAR-1 Summary Report	N/A
S/N 06226	5/11/06	Dom	Request to use alternative UT sizing techniques. Relief Request IR-2-42	Approved S/N 07-366 (5/1/07
S/N 06226	5/11/06	Dom	Request to use Code Case N-696. Relief Request IR-2-43	Approved S/N 07-369 (5/2/07
S/N 06-226	5/11/06	Dom	Request to use PDI qualified procedures, equipment, and personnel for Non-PDI RPV Flange to shell weld. Relief Request IR-2-44	Approved S/N 07-368 (5/1/07)

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)
(Sheet 15 of 16)

File No.	Date	Orig.	Commitment	Compliance Verification
S/N 07-340	5/3/07	Dom	Inservice Inspection and Testing 10-Year Interval changes.	N/A
S/N 07-0207	7/2/07	Dom	Proposed Tech. Spec. change for ISI/IST deleting reference to ISI and change of reference code from ASME Section XI to OM for IST.	Approved S/N 08-0498 (7/31/08)
S/N 07-397	7/13/07	Dom	Results of Reactor Vessel Head inspection required by NRC order EA-03-009.	N/A
S/N 07-0494	7/13/07	Dom	Inspection and mitigation of Alloy 82/182 PZR butt welds and additional information on completion of weld overlays.	N/A
S/N 07-0530	8/03/07	Dom	OAR-1 3R11 Outage Summary Report	N/A
S/N 0338	11/09/07	Dom	Alternative request for pressure testing of Class 2 Buried Piping	Approved S/N 08-0437 (7/10/08)
S/N 0338	11/09/07	Dom	Alternative request for pressure testing of Class 3 Buried Piping	Approved S/N 08-0437 (7/10/08)
S/N 07-0416	2/25/08	Dom	Alternative request to use Section III Code Cases N-756 and N-757.	Approved S/N 08-0111 (2/25/08)

TABLE 8.1
MPS3 ISI COMMITMENT / CORRESPONDENCE TRACKING LOG (continued)

File No.	Date	Orig.	Commitment	Compliance Verification
S/N 08-0498	7/31/08	NRC	NRC Approval for Tech Spec change to remove Inservice Inspection from Tech Specs	N/A
RA-08-026	10/27/08	Dom	MPR-139 MRP Deviation Notification	Accepted in MRP meeting minutes dated December 2, 2008
S/N 08-0523	10/27/08	Dom	NRC Notification of MPR-139 deviation.	N/A
S/N 09-050	2/13/09	Dom	OAR-1 3R12 Outage Summary Report	N/A

9. RELIEF REQUESTS

9.1 Alternative Requirements

9.1.1 Code Cases Not Approved for Use

ASME publishes Code Cases which explain the intent of Code rules or provide for alternative requirements under special circumstances. Section 3 of this document describes the use of approved Code Cases. If it is determined that it would be beneficial to utilize Code Cases which provide alternative requirements to the inspection requirements of ASME Section XI as documented in this program manual which have not been approved for use in Regulatory Guide 1.147, relief requests will be filed in accordance with 10 CFR 50.55a(a)(3).

9.1.2 Hardship or Unusual Difficulty

[Commitment Table 8.1, File B16368]
During Inservice Inspection, there are cases where compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. An example of this is encountering significant radiation exposure during the performance of an examination. If such circumstances are identified, relief requests will be filed in accordance with 10 CFR 50.55a(a)(3).

9.2 Impractical Requirements

During Inservice Inspection, there are cases where component configuration and/or interferences prohibit coverage of the code required volume or surfaces. In each case where such limitations have been encountered the details are documented in a relief request. If additional conditions are encountered where the inspection requirements of ASME Section XI as documented in this program manual cannot be met, relief requests will be filed in accordance with 10 CFR 50.55a(g)(5)(iii).

9.3 **Format**

Relief requests are numbered sequentially, with relief requests issued during the third interval indicated by the number "3", i.e., IR-3-XX. Each relief request will be formatted in accordance with the Nuclear Energy Institute (NEI) Standard Format for Requests Pursuant to 10 CFR 50.55, Revision 1, dated June 7, 2004.

9.4 **Relief Request Summary Tables**

9.4.1 Relief Requests which were submitted during the First Interval are listed in Table 9.4-1 and are included as historical information. The Table includes an evaluation of the applicability of a similar Relief Request to the Second Interval Program.

9.4.2 Relief Requests which were submitted during the Second Interval ISI Program are listed in Table 9.4-2 and are included as historical information.

9.4.3 Relief Requests applicable to the Third Interval ISI Program are listed in Table 9.4-3. Copies of Relief Requests are in Attachment 2. Additional relief requests, as deemed necessary, will be submitted pursuant to the requirements of 10 CFR 50.55a(a)(3) or 10 CFR 50.55a(g)(5)(iii).

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE
(Sheet 1 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-1 (Rev. 3)	Pressure Retaining Welds in Reactor Vessel	B-A	B1.12	Reactor Vessel Shell	Pressure Retaining Longitudinal Welds in the Beltline Region: Welds 6, 7, & 8	Volumetric Exam of 100% of length of all welds	Volumetric Exam of accessible portions of welds	Granted	03/03/93
		B-A	B1.21	Reactor Vessel Bottom Head	Pressure Retaining Circumferential Weld (lower shell-to-bottom head 101-141)	Volumetric Exam of accessible length of all welds			
Reference Document	B13932 (10/30/91)(s) NRC Letter A10880 (3/3/93) includes Safety Evaluation of 1st 10 Year ISI Program Summary Report, Rev. 3 (G)								
Second Interval Applicability	A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.								
IR-2 (Rev. 2)	Pressure Retaining Welds in Reactor Vessel Closure Head	B-A	B1.22	Reactor Vessel Closure Head	Pressure Retaining Meridional Weld No. 101-104D	Volumetric Exam of accessible length of all welds	Volumetric Exam of accessible portions of weld	Relief not required	02/08/91
		B-A	B1.40	Reactor Vessel Head Flange	Head-to-flange Weld No. 101-101	Volumetric and surface exam	Volumetric and surface exam of accessible portions of weld	Granted	
Reference Document	NU Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Evaluation of 1st 10 Yr Prog. & TER (SAIC Report)(G) Note: IR-2 Rev. 2 resubmitted in B13932 (10/30/91) NRC Response A10880 (3/3/93) did not grant further relief								
Second Interval Applicability	A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test The Meridional Head weld would not require relief based on Code Case N-460. Relief request should be submitted following performance of examinations during the second Ten-Year interval								

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 2 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-3	Pressure Retaining Welds in Vessels Other Than Reactor Vessels	B-B	B2.11	Pressurizer	Pressure Retaining Circumferential shell-to-head welds 03-007-SW-J 03-007-SW-F	Volumetric	Volumetric Exam of accessible portions of weld	Granted	02/08/91
Reference Document									
	Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Evaluation of 1st 10 yr. Program & TER (SAIC Report)(G)								
Second Interval Applicability									
	A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test The Shell to Upper Head weld would not require relief based on Code Case N-460. Relief request should be submitted following performance of examinations during the second Ten-Year interval								
IR-4	Internal Surfaces of Pump Casings and Valve Bodies	B-L-2	B12.20	Pump Casings	Internal surfaces of pumps	Visual, VT-3	Class 1 pumps will receive a visual exam (VT-3) when they are disassembled	Granted	02/08/91
		B-M-2	B12.50	Valve Bodies	Internal surfaces of valve bodies	Visual, VT-3	Class 1 valves will receive a visual examination (VT-3) when they are disassembled		
Reference Document									
	Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Evaluation of 1st 10 yr. Program & TER (SAIC Report)(G)								
Second Interval Applicability									
	A similar relief request will not be required for the second Ten-Year ISI interval. The 1989 Code has addressed this concern in the footnotes of Table IWB-2500-1, Examination Category B-L-2 and B-M-2 by adding the following: "Examination is required only when a pump or valve is disassembled for maintenance, repair, or volumetric examination. Examination of the internal pressure boundary shall be performed to the extent practicable. Examination is required only once during the inspection interval."								

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 3 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-6	Integrally Welded Attachments to Vessels	B-H	B8.20	Pressurizer	Integrally Welded Attachment: 03-007-SW-X	Surface Exam	Inspect per Code Case N-323	Granted	3/3/93
Reference Document									
B13932(10/30/91)(S) NRC Letter A10880 (3/3/93) includes Safety Eval of 1st 10 Year ISI Program Summary Report, Rev. 3 (G)									
Second Interval Applicability									
A similar relief request will be required for the second Ten-Year ISI interval. Code Case N-323 which is referenced in this relief request is not applicable to the 1989 Edition of the Code. Evaluation of alternate examination methods and submittal of the relief request should be made prior to performance of the examinations when the limitation and examination coverage percentage can be accurately determined.									
IR-7		C-B	C2.21	Steam Generators	Full penetration nozzle-to-vessel welds: 03-003-SW-R S/G A 03-003-SW-T S/G A	Volumetric and surface	Volumetric and surface on accessible areas	Granted	2/08/91
Reference Document									
Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Eval.of 1st 10 yr. Program & TER (SAIC Report)(G)									
Second Interval Applicability									
A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.									

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 4 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-8		B-D	B3.110	Pressurizer	Nozzle-to- vessel welds: 03-007-SW-A 03-007-SW-B 03-007-SW-C 03-007-SW-D 03-007-SW-E 03-007-SW-S	Volumetric	Volumetric exam of accessible portions of weld	Granted	2/08/91
		B-D	B3.130	Steam Generator	Nozzle-to- vessel welds: 03-003-SW-V Inlet 03-003-SW-U Outlet 03-004-SW-V Inlet 03-004-SW-U Outlet 03-005-SW-V Inlet 03-005-SW-U Outlet 03-006-SW-V Inlet 03-006-SW-U Outlet	Volumetric	Volumetric exam of accessible portions of weld		

Reference Document

Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Eval of 1st 10 yr. Program & TER (SAIC Report)(G)

Second Interval Applicability

A similar relief request will be required for the second Ten-Year ISI interval for the Pressurizer Vessel to Nozzle welds; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 5 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-9 (Rev. 2)		B-J	B9.11	Piping pressure boundary nominal pipe size (NPS) 4" or larger	Safe end-to- pipe welds	Surface and volumetric	Full volumetric exam from the ID surface; OD surfaces will be visually examined	Granted pursuant with demo witness by NRC in 3/95	3/03/93 2/08/91
		B-F	B5.10	Reactor Vessel	Nozzle-to-safe end butt welds	Surface and volumetric	Full volumetric exam from the ID surface; OD surface will be visually examined.	See above.	
Reference Document									
	Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Eval of 1st 10 yr. Program & TER (SAIC Report)(G). Note: IR-9, Rev. 1, resubmitted in B13932 (10/30/91) NRC Response A10880 (3/3/93)(G). Revision 2 submitted in B17593 (12-21-98). NRC Response A14092 (5/11/99) (G).								
Second Interval Applicability									
	A similar relief request (IR-2-03) has been incorporated in the Second Interval Program.								
IR-10	Centrifugally cast stainless steel component to fitting welds	B-J	B9.11	Piping welds NPS 4" or larger	Centrifugally cast stainless steel component-to fitting welds: LP4-EC-1-SW-B RCS-20-FW-37 RCS-20-FW-38 RCS-20-FW-39	Volumetric and surface	Volumetric and surface on accessible portions	Granted	2/08/91
Reference Document									
	Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Eval of 1st 10 yr. Program & TER (SAIC Report)(G).								
Second Interval Applicability									
	A similar relief request will be required for the second Ten-Year ISI interval for two of the welds. Welds LP4-EC-2-SW-B and RCS-20-FW-39 will not require relief based on Code Case N-460. Since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.								

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 6 of 11)

<table>
<tr><th>Relief Request</th><th>Title</th><th>Exam. Cat.</th><th>Item No.</th><th>System or Component</th><th>Volume or Area To Be Examined</th><th>Required Method</th><th>Licensee Proposed Alternative</th><th>Status</th><th>Date Approved</th></tr>
<tr><td>IR-11</td><td>Pressure retaining welds in piping</td><td>B-J</td><td>B9.11</td><td>Piping welds NPS 4" or larger</td><td>Pressure retaining weld in Class 1
SIL-6.6-SW-B</td><td>Volumetric and surface</td><td>Volumetric and surface on accessible portions</td><td>Granted</td><td>2/08/91</td></tr>
<tr><td colspan="10">Reference Document
Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Eval of 1st 10 yr. Program & TER (SAIC Report)(G).</td></tr>
<tr><td colspan="10">Second Interval Applicability
A similar relief request will <u>not</u> be required for the second Ten-Year ISI interval based on Code Case N-460.</td></tr>
<tr><td>IR-12</td><td>Pressure retaining welds in piping</td><td>C-F-1
C-F-2</td><td>C5.11
C5.51
C5.81</td><td>Piping welds NPS 4" or larger</td><td>Welds:
MSS-33-FW-1-GM
MSS-33-FW-1-HM
MSS-30-FW-2-7M
FWS-17-6-SW-E
SIL-25-FW-2
SIL-25-FW-1-7M</td><td>Volumetric and surface</td><td>Volumetric and surface on accessible portions</td><td>Granted (not required for FWS weld)</td><td>3/03/93</td></tr>
<tr><td colspan="10">Reference Document
B13932 (10/30/91)(S) NRC Letter A10880 (3/3/93) includes safety Eval of 1st 10 yr ISI program summary report, Rev. 3 (G)</td></tr>
<tr><td colspan="10">Second Interval Applicability
A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.</td></tr>
<tr><td>IR-13 (Rev. 1)</td><td></td><td>C-C</td><td>C3.20</td><td>Piping</td><td>Integrally welded attachments for piping weld
3-SIL-4-PSR-040</td><td>Surface</td><td>Surface exam on the accessible portions</td><td>Granted</td><td>2/08/91</td></tr>
<tr><td colspan="10">Reference Document
Letter (5/22/86)(S) NRC A09339 Letter (2/8/91) includes Safety Eval of 1st 10 yr. Program & TER (SAIC Report)(G).</td></tr>
<tr><td colspan="10">Second Interval Applicability
A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.</td></tr>
</table>

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 7 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-14		C-A	C1.10	Residual heat exchanger	shell to flange circumferential welds	Volumetric	Volumetric on the *accessible portion;* inaccessible portion will receive a liquid penetrant exam	Granted	2/08/91
Reference Document									
Letter (5/22/86)(S) NRC Letter A09339 (2/8/91) includes Safety Eval of 1st 10 yr. Program & TER (SAIC Report)(G).									
Second Interval Applicability									
A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.									
IR-18		B-H	B8.20	Pressurizer	Integrally welded attachments	Volumetric or surface	Perform in same period vs. over int.	Granted	3/03/93
Reference Document									
B13932 (10/30/91)(S) NRC Letter A10880 (3/03/93) includes Safety Eval of 1st 10 yr ISI program summary report, Rev 3 (G)									
Second Interval Applicability									
A similar relief request (IR-2-04) has been incorporated in the Second Interval Program.									
IR-19	Inner radius of main steam nozzles of SGs	C-B	C2.22	SG main steam nozzle	Inner radius of main steam nozzle off of SGs	Volumetric	Visual exam during leak test	Granted	5/04/95
Reference Document									
B15064 (12/16/94)(S), B15175 (3/29/95)(S), A12289 (5/04/95)(G)									
Second Interval Applicability									
A similar relief request (IR-2-05)has been incorporated in the Second Interval Program.									

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 8 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-20	Integrally welded att. Welds	B-K-1	B10.10	Piping	Integrally welded attachments *for piping welds:* RCS-504B-PSSH507 RCS-504B-PSSH508	Surface	Surface exam on *accessible portions*	Granted	6/28/96
Reference Document									
	B15475 (1/12/96)(S), A12893 (6/28/96) (G) Note: *NRC to reevaluate if Code Case N-509 is requested for use in the future.*								
Second Interval Applicability									
	A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.								
IR-21	Pressure retaining welds in reactor vessel	B-D	B3.90 B3.100	RV nozzle welds	107-121A, 105-121A, 105-121B, 107-121B, 107-121C, 105-121C, 105-121D, 107-121D	Volumetric	Vol. exam on accessible portions including sys. Leak test.	Granted	6/28/96
Reference Document									
	B15475 (1/12/96)(S), A12893 (6/28/96) (G)								
Second Interval Applicability									
	A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate *examinations should not include a hydrostatic test.* Relief request should be submitted following performance of examinations during the second Ten-Year interval.								

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 9 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-22	Pressure retaining dissimilar metal welds of SGs	B-F	B5.70	SG nozzle to safe end welds	RCS-LP1-FW-4 RCS-LP1-FW-5 RCS-LP2-FW-4 RCS-LP2-FW-5 RCS-LP3-FW-4 RCS-LP3-FW-5 RCS-LP4-FW-4 RCS-LP4-FW-5	Volumetric and surface	Vol. and surface exam on accessible portions including sys. Leak test.	Granted	6/28/96
Reference Document B15475 (1/12/96)(S), A12893 (6/28/96) (G) Second Interval Applicability A similar relief request will be required for the second Ten-Year ISI interval; however, since Code Case N-498-1 has been utilized the proposed alternate examinations should not include a hydrostatic test. Relief request should be submitted following performance of examinations during the second Ten-Year interval.									
IR-23	Exemption from repair requirements of IWA-4000 for piping valves, fit., nominal pipe size 1" and smaller and associated supports	See relief request	See relief request	Class 1, 2, 3 components	See relief request	See relief request	All repairs will be done in accordance with our QA program	Withdrawn	N/A
Reference Document B15120 (12/15/95)(S), B15659 (6/07/96), B17409 (W) Second Interval Applicability Letter B15120 also requested permission to use this relief request in the Second Interval Program..									

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 10 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-24	Exemption from Repair/ replacement requirements of IWA-4000 and IWA-7000 for seal welds			Class 1, 2, 3 components			QA program uses only qual. welders & procedures	Withdrawn	N/A
Reference Document									
	B15120 (12/15/95)(S), B15659 (6/07/96), B17409 (W)								
Second Interval Applicability									
	Letter B15120 also requested permission to use this relief request in the Second Interval Program.								
IR-26	Reactor Pressure Vessel Lower Head Welds	B-A	B1.21	Lower Head Circumferential Welds	102-151	Volumetric	Volumetric exam on accessible portions; Inservice system leakage test.	Granted	2/17/98
			B1.22	Lower Head Meridional Welds	101-154A 101-154B 101-154C 101-154D				
Reference Document									
	B16647 (7/31/97) (S), A13670 (2/17/98) (G)								
Second Interval Applicability									
	A similar relief request will be required for the second Ten-Year ISI interval. Relief request should be submitted following performance of examinations during the second Ten-Year interval.								

TABLE 9.4-1
FIRST INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 11 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-27	Reactor Pressure Vessel Shell to Flange Weld	B-A	B1.30	Shell to Flange Weld	101 - 121	Volumetric	Vol. exam on accessible portions. Inservice leakage test.	Granted	2-22-99
Reference Document									
	B17468 (9-23/98) (S)								
Second Interval Applicability									
IR-28	Relief from Visual Examination	F-A	F1.40	CL. 1 RPV	Supports RVS-1 RVS-2 RVS-3 RVS-4	VT-3	VT-3 accessible portions including surrounding insulation.	Granted	11/3/99
Reference Document									
	B17867 (9/17/99) (S), A15133 (11/3/99) (G)								
Second Interval Applicability	A similar will be required for the second Ten Year ISI Interval.								

NOTE: For the reference documents, the following are applied: (S) = Submitted, (W) = Withdrawn, (G) = Granted, (D) = Denied

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE
(Sheet 1 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-01	Utilization of Code Cases N-389-1 N-416-1 N-491-1, N-498-1, N-521, N-522, and N-524	B-D, B-F B-J, B-P C-F-1 C-F-2 C-H D-A, D-B D-C, F-A	Various	Various	Various	As set forth in the 1989 Edition of the ASME Boiler and Pressure Vessel Code	Alternatives as listed in the referenced Code Cases	Granted	7/24/2000
Reference Document: B17752 (4/7/99)(S), A15322 (7/24/00)(G)									
IR-2-02	Snubber Examination and Testing	-	-	Snubbers	-	Per IWF-5300, as set forth in the first addenda to ASME/ANSI OM-1987 (OMa-1988), Part 4	As set forth in the current Technical Specifications in accordance with Generic Letter 90-09	Granted	7/24/2000
Reference Document: B17752 (4/7/99)(S), A15322 (7/24/00)(G)									
IR-2-03	Proposed Alternate Examination to Reduce Exposure	B-J	B9.11	Piping pressure boundary nominal pipe size (NPS) 4" or larger	Safe end-to- pipe welds	Surface and volumetric	Full volumetric exam from the ID surface	Granted	7/24/2000
		B-F	B5.10	Reactor Vessel	Nozzle-to-safe end butt welds	Surface and volumetric	Full volumetric exam from the ID surface		
Reference Document: B17752 (4/7/99)(S), A15322 (7/24/00)(G)									

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 2 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-04	Proposed Alternate Examination to Reduce Exposure	B-H	B8.20	Pressurizer	Integrally welded attachments	Volumetric or *surface*	Perform in same *period vs. over int.*	Granted	7/24/2000
Reference Document: B17752 (4/7/99)(S), A15322 (7/24/00)(G)									
IR-2-05	Proposed Alternate to Impractical Examination	C-B		SG main steam nozzle	Inner radius of main steam nozzle off of SGs	Volumetric	Visual exam during leak test	Granted	7/24/2000
Reference Document: B17752 (4/7/99)(S), A15322 (7/24/00)(G)									
IR-2-06 (Rev.1)	Utilization of Code Case N-566-1	all	-	-	Leakage Identified at Bolted Connections	As set forth in IWA-5250(a)(2)	Alternative as listed in the referenced Code Case	Granted	7/24/2000
Reference Document: B17752 (4/7/99)(S), B18146 (6/21/00(S), A15322 (7/24/00)(G)									
IR-2-07	Utilization of Alternative Requirements for ISI Intervals *per Code Case* N-535	all	all	all	-	-	Alternative as listed in the referenced Code Case	Granted	7/24/2000
Reference Document: B17752 (4/7/99)(S), A15322 (7/24/00)(G)									

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 3 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-08	Utilization of Code Case N-533	Various	Various	Class 1 Systems	Insulated Pressure Retaining Bolted Connections	VT-2	Alternative as listed in the referenced Code Case with additional requirement of a 4 hour hold time.	Granted	7/24/2000
Reference Document: B17752 (4/7/99)(S), A15322 (7/24/00)(G)									
IR-2-09	Utilization of Code Case N-546	Various	Various	Class 1, 2 & 3 Systems	Qualification of VT-2 Examination Personnel	VT-2	Alternative as listed in the referenced Code Case with additional requirements to test examiners	Granted	7/24/2000
Reference Document: B17752 (4/7/99)(S), A15322 (7/24/00)(G)									
IR-2-10	Utilization of Code Case N-532	All	All	Class 1, 2, & 3 Systems	Repair and Replacement and Inservice Summary Documentation Preparation.	_	Alternative as listed in the referenced Code Case	Granted	8/24/00
Reference Document: B17871 (9/23/98)(S), A15335 (8/24/00)(G)									
IR-2-11	Utilization of Code Case N-619	B-D	B3.120 B3.140	CL. 1 Nozzle inner Radius	-	UT		Not Submitted	

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 4 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-13	Nozzle to Shell Weld	C-B	C2.21	Steam Generator	Nozzle-to-Vessel Weld 03-53-SW-R	Volumetric and surface	Volumetric and Surface exam of accessible portions, including VT-2	Granted	10/04/00
Reference Document: B18098 (5/31/00)(S), A15356 (10/4/00)(G)									
IR-2-14	Shell-to-Flange weld	C-A	C1.10	B-RHR Heat Exchanger	Shell -to-Flange Weld 03-074-004	Volumetric	Volumetric accessible portions and surface exam of the areas inaccessible for volumetric., including VT-2.	Granted	10/04/00
Reference Document B18098 (5/31/00)(S), A15356 (10/4/00)(G)									
IR-2-15	Alternative Length Sizing Criteria	B-A	B1.10 B1.20	Reactor Pressure Vessel	RPV Shell Welds, Head Welds Subject to Append. VIII	Length Sizing Qual. Criteria - 1/4 inch + 1 inch	Length Sizing Qual. Criteria to be 0.75 inch RMS.	granted	1/26/01
Reference Document B18202 (8/25/00)(S), B18253 (11/8/00)(S) A15423 (1/26/01)(G)									
IR-2-16	Single Sided access	B-J, C-F-1	-	Austenitic welds	Single side weld exam	UT	Document restricted coverage on OAR-1 report in lieu of Relief Request	Withdrawn	
Reference Document B18202 (8/25/00)(S), B18253 (11/8/00)(W)									

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 5 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-17	Annual ultrasonic retraining	Various	Various	Components subject to ASME Appendix VII	-	UT	Annual UT training shall be conducted IAW 50.55a(b)(2)(xiv) in lieu of Sec. XI	Granted	1/26/01
Reference Document	B18202 (8/25/00)(S), B18253 (11/8/00)(S) A15423 (1/26/01)(G)								
IR-2-18	Delay implementation of CP-189	Various	Various	Components subject to ASME Appendix VII	-	-	Written practice will be updated to meet CP-189 by August 1, 2001	Granted (Expired 8/1/01)	1/26/01
Reference Document	B18202 (8/25/00)(S), B18253 (11/8/00)(S) A15423 (1/26/01)(G)								
IR-2-19	Request to use Code Case N-616	Various	Various	Class 1, 2, and 3 Systems	Pressure retaining bolted connections of borated systems -	- VT-2	As listed in the referenced Code Case	Not Submitted	
Reference Document									
IR-2-20	Request to use Code Case N-586	Various	Various	Class 1, 2, and 3 piping, components and supports	Alternative Additional examination requirements	-	As listed in the referenced Code Case	Not Submitted	
Reference Document									
1-RI-ISI-01	Class 1 Risk Informed Program Implementation	B-J, B-F	Various	Class 1 piping welds	Piping welds	-Surface and Volumetric Examination as applicable	As stated in the Class 1 ISI Risk Informed Program	Granted	3/12/02
Reference Document	B18124 (7/25/00)(S), B18470 (9/26/01)(S) A15653 (3/12/02)(G)								

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 6 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-21	Pressure retaining welds in Reactor Vessel Closure Head	B-A	B1.40	Rx Vessel Head Flange	Head-to-Flange Weld No. 101-101	Volumetric and surface Examination	Volumetric and surface examination of accessible portions of the weld	Granted	8/20/02
Reference Document	B18490 (9/27/01)(S), A15742 (8/20/02)(G)								
I IR-2-22	Full penetration Welds of Nozzles in Vessels	B-B	B1.40	Steam Generator Nozzle-to-Shell	- Nozzle-to-Shell Weld No. 03-003-SW-U, 03-003-SW-V 03-004-SW-U 03-004-SW-V	-Volumetric	Volumetric examination of the accessible portions of the weld	Granted	8/20/02
Reference Document	B18490 (9/27/01)(S), A15742 (8/20/02)(G)								
IR-2-23	Pressure Retaining Dissimilar Metal Welds	B-F	B5.70	Steam Generator Nozzle-to-Pipe welds	Nozzle-to-Pipe Weld No. RCS-LP3-FW-4 RCS-LP3-FW-5 RCS-LP4-FW-4 RCS-LP4-FW-5	-Volumetric and surface examination	Volumetric and surface examination of the accessible portions of the weld	Granted	8/20/02
Reference Document	B18490 (9/27/01)(S), A15742 (8/20/02)(G)								
IR-2-24	Pressure retaining Nozzle Welds in Vessels	C-B	C2.21	Steam Generator Nozzle-to-Head Weld	-Nozzle-to-Head Weld No. 03-053-SW-T	-Volumetric and Surface examination	Volumetric and surface examination of the accessible portions of the weld	Granted	8/20/02
Reference Document	B18490 (9/27/01)(S), A15742 (8/20/02)(G)								
IR-2-25 (Rev.1)	Pressure Retaining Welds in Austenitic Stainless Steel	C-F-1	C5.10	Circumferential Pipe Welds	-Pipe welds as listed in Relief Request	--Volumetric and Surface examination	Volumetric and surface examination of the accessible portions of the weld	Granted	8/20/02
Reference Document	B18490 (9/27/01)(S), B18657 (5/30/02)(S), A15742 (8/20/02)(G)								

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 7 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-26 (Rev. 1)	Integral Attachments in Vessels	B-H	B8.20	Pressurizer Support Skirt-to-Shell Weld	-Skirt-to Shell Weld No. 03-007-SW-X	-Surface examination	Surface examination of the accessible portion and a best effort volumetric (UT) examination.	Granted	8/20/02
Reference Document	B18490 (9/27/01)(S), B18657 (5/30/02)(S), A15742 (8/20/02)(G)								
IR-2-27	Use of proposed alternative to allow one time use of Non-ASME Certificate holder to perform R/R fabrication activities.	C-F-2 C-C	C5.81 C3.20	Feedwater piping and attachment welds	Piping and welds as listed in Relief Request	-	Provisions of Appendix B to be used along with the participation of the ANI in lieu of	Granted	6/12/04
Reference Document	B18796 (11/26/02)(S), S/N 04-027 (1/12/04)(G)								
IR-2-28	Request to use 1998 Edition of *Section XI for* Repair/ Replacement	N/A	N/A	N/A	-	-	Use of 1998 Edition of Section XI	Not Submitted	N/A
IR-2-29	Request to use 1998 Edition of *Section* XI, IWX-2430 for choosing additional exams.	Various	Various	All	Various	Various	Use of 1998 Edition of Section XI	Not Submitted	N/A
IR-2-30 THRU IR-2-35	Numbers Not Used	-	-	-	-	-	-	-	N/A

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 8 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-36	Request to use Code Case N-663	C-F-1 C-F-2	C5.10 Thru C5.40 and C550 Thru C5.82	Class 2 piping welds	In Accordance with ASME Section XI.	MT/PT	Examinations limited to those areas identified as susceptible to outside surface attack.	Granted	5/04/04
Reference Document	B19021 (3/30/04)(S), S/N 04-315 (5/04/04)(G)								
RR-89-52	Request to use Temporary Non-Code repair in Service Water Sys. Brazed joints	N/A	N/A	Service Water to 3CCI*E1A	-	-	Monitor leakage and Periodic follow-up NDE until permanent repair can be performed during the next shutdown.	Granted	9/22/05
Reference Document	S/N 04-535 (9/23/04)(S), S/N 05-666 (9/22/2005(G)								
IR-2-37	Temporary Non-Code Repair of a Brazed joint in Service Water System Drain Line	N/A	N/A	-	-	-	-	Withdrawn	N/A
Reference Document	S/N 05-100 (5/9/05) (S), S/N 05-100A (12/15/05 (W)								
IR-2-38	Alternative Brazed Joint Assessment Methodology	N/A	N/A	SWP Class 3 brazed joints	-	-	Perform Structural integrity assessment with supplemental UT in lieu of immediate repair.	Granted	02/28/07
Reference Document	S/N 05-201 (6/9/05) (S), S/N 07-0153 (02/28/07) (G)								

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 9 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-39 Rev. 1	Use of Weld Overlay and Associated Alternative Repair Technique	R-A	R1.11 R1.15	Pressurizer nozzle to safe end weld 03-X-5641-E-T	-	-	Full structural weld overlay	Granted	01/23/06
Reference Document	S/N 05-708A (10/19/05) (S), S/N 06-064 (01/23/06) (G)								
IR-2-40	Proposed Alternative From Pressure Test Requirements of ASME Section XI, IWA5244 Buried Piping (Class 2 Piping)	C-H	C7.30	QSS SIL FWA	Buried piping	IWA-5244(a) IWA-5244(b)	IWA-5244(c) Full flow testing	Granted	07/10/08
Reference Document	S/N 07-0338 (11/09/07) (S), S/N 08-0437 (07/10/08) (G)								
IR-2-41	Proposed Alternative From Pressure Test Requirements of ASME Section XI, IWA5244 Buried Piping (Class 3 Piping)	D-B	D2.10	SWP	Buried piping	IWA-5244(a) IWA-5244(b)	IWA-5244(c) Full flow testing	Granted	07/10/08
Reference Document	S/N 07-0338 (11/09/07) (S), S/N 08-0437 (07/10/08) (G)								
IR-2-42	Request to Use Alternative Sizing Criteria	R-A	R1.15	RCS	Reactor vessel nozzle to safe end welds	UT	Use of .224 RMS error in lieu of .125 for depth sizing	Granted	05/01/07
Reference Document	S/N 06-226 (05/11/06) (S), S/N 07-366 (05/01/07) (G)								

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 10 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-43	Request Use of ASME Code Case N-696	R-A	R1.15	RCS	Reactor vessel nozzle to safe end welds	UT	Use of ASME Code Case N-696 for qualification requirements for Appendix VIII piping examinations conducted from the inside surface	Granted	05/02/07
Reference Document S/N 06-226 (05/11/06) (S), S/N 07-369 (05/02/07) (G)									
IR-2-44	Request the Use of PDI Qualified Procedures, Personnel and Equipment for Non-Appendix VIII Reactor Vessel Shell-to-Flange Weld	B-A	B1.30	RCS	Reactor vessel shell to flange weld	UT	Perform UT examinations using procedures, personnel, and equipment qualified in accordance with Appendix VIII (PDI).	Granted	05/01/07
Reference Document S/N 06-226 (05/11/06) (S), S/N 07-368 (05/01/07) (G)									
IR-2-45	Request Alternative Class 1 Pressure Test Requirements	B-P	B15.51 B15.71	Various	Class 1 system pressure boundary	VT-2	See Relief request	Granted	09/27/07
Reference Document S/N 06-305 (08/17/06 (S), S/N 07-0676 (09/27/07) (G)									

TABLE 9.4-2
SECOND INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 11 of 11)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-2-46	Relaxation of the requirements of Order EA-03-009 Regarding Reactor Vessel Head Inspections	N/A	N/A	RCS	Reactor Vessel Head	UT		Granted	05/02/07
Reference Document									
S/N 06-251 (05/16/06((S), S/N 07-0370 (05/02/07) (G)									
IR-2-47	Request Use of Weld Overlays as an Alternative Repair Technique	N/A	RCS	Pressurizer Nozzle to Safe end welds	-	-	Full structural weld overlay	Granted	05/03/07
Reference Document									
S/N 06-731 (10/17/06)(S), S/N 07-371 (05/03/07) (G)									
IR-2-48	Request to Use Code Case N-532-4	N/A	N/A	-	-	-	-	Not Submitted	N/A
Reference Document									
N/A									
IR-2-49	Alternative Request to Use ASME Section III Code Cases N-756 and N-757	N/A	N/A	Class 1, 2, and 3 valves	-	-	Alternative rules for acceptability for Class 1 (N-756) and Class 2, 3 (N-757) NPS 1 and smaller	Granted	02/25/08
Reference Document									
S/N 07-0416 (07/25/07) (S), S/N 08-0111 (02/25/08) (G)									

NOTE: For the reference documents, the following are applied: (S) = Submitted, (W) = Withdrawn, (G) = Granted, D) = Denied

TABLE 9.4-3
THIRD INTERVAL RELIEF REQUEST SUMMARY TABLE
(Sheet 1 of 3)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-3-01	Snubber Examination and Testing	N/A	N/A	Snubbers	Snubber and attachment hardware examination and testing		Use Technical Specification 4.7.10		
Reference Document									
IR-3-02	Relief from volumetric exam of nozzle inside radius sections of Main Steam nozzles	C-B	C2.22	SG main steam nozzle	Inner radius of main steam nozzle off of SGs	Volumetric	Visual exam during leak test		
Reference Document									
IR-3-03								Not Submitted	
Reference Document									
IR-3-04	Alternative brazed joint assessment methodology	N/A	N/A	SWP Class 3 brazed joints	-	-	Perform Structural integrity assessment with supplemental UT in lieu of immediate repair.		
Reference Document									
IR-3-05	Examination of Weld Overlays	R-A	R1.11 R1.15	Six (6) Pressurizer nozzle to safe end welds and one (1) Pressurizer safe end to pipe weld	Volume of welds defined in Code Case N-770	Volumetric	Use of examination criteria of Code Case N-770		
Reference Document									

TABLE 9.4-3
THIRD INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 2 of 3)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-3-06	Pressure testing of Class 2 buried piping	C-H	C7.30	QSS SIL FWA	Buried piping	IWA-5244(a) IWA-5244(b)	IWA-5244(b)(2) Full flow testing		
Reference Document									
IR-3-07	Pressure testing of Class 3 buried piping	D-B	D2.10	SWP	Buried piping	IWA-5244(a) IWA-5244(b)	IWA-5244(b)(2) Full flow testing		
Reference Document									
IR-3-08	Implementation of Appendix VIII Supplements 4 and 6 - use of PDI qualified procedures, personnel, and equipment for non-Appendix VIII RPV flange-to-vessel weld	B-A	B1.30	RCS	Reactor vessel shell to flange weld	UT	Perform UT examinations using procedures, personnel, and equipment qualified in accordance with Appendix VIII (PDI).		
Reference Document									

TABLE 9.4-3
THIRD INTERVAL RELIEF REQUEST SUMMARY TABLE (continued)
(Sheet 3 of 3)

Relief Request	Title	Exam. Cat.	Item No.	System or Component	Volume or Area To Be Examined	Required Method	Licensee Proposed Alternative	Status	Date Approved
IR-3-09	Use of alternative pressure testing criteria for the system leakage test conducted at or near the end of the inspection interval on Class 1 piping	B-P	B15.10	Various	Class 1 system pressure boundary	VT-2 Visual	Perform VT-2 *examination of* certain components at a reduced pressure and other components in their *normally isolated* condition		
Reference Document									
IR-3-10	Alternative examination criteria for the visual examination of Reactor Coolant System hot leg and cold leg nozzle-to-safe end welds	B-P	B15.10	Reactor Coolant system	Hot leg and cold leg nozzle to pipe welds	VE Visual	Perform Volumetric Exams in lieu of Visual Examination		
Reference Document									
IR-3-11	Alternative pressure testing requirements for the RPV flange leak-off piping	B-P	B15.10	RPV flange leak-off piping	RPV flange leak-off piping	VT-2 Visual	Perform VT-2 visual examination each outage on the unpressurized subject piping		
Reference Document									

10. Reserved for Future Use

11. DRAWINGS

The applicable zone drawings for component welds and supports, and their associated Program Plan listings are maintained on site as part of the Inservice Inspection Program Manual.

12. IMPLEMENTATION OF ASME SECTION XI, APPENDIX VIII

Program Basis

10 CFR 50.55a, as amended by the Federal Register Published September 22, 1999, Volume 64, Number 183 (Final Rule) required expedited implementation of Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems". The effective date for the expedited implementation was November 22, 1999.

Effective Code

DNC will implement Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems" in accordance with ASME Section XI, 2001 Edition for the 3rd Inspection Interval of MPS3.

Implementation Schedule

DNC has implemented Appendix VIII in accordance with the following schedule as defined in 10 CFR 50.55a:

SUPPLEMENT	QUALIFICATION REQUIREMENTS	IMPLEMENTATION DATE
1	Evaluating Electronic Characteristics of Ultrasonic Systems	May 22, 2000
2	Wrought Austenitic Piping Welds	May 22, 2000
3	Ferritic Piping Welds	May 22, 2000
4	Clad/Base Metal Interface of Reactor Vessel	November 22, 2000
5	Nozzle Inside Radius Section	November 22, 2002
6	Reactor Vessel Welds Other Than Clad/Base Metal Interface	November 22, 2000
7	Nozzle-to-Vessel Welds	November 22, 2002
8	Bolts and Studs	May 22, 2000
9	Cast Austenitic Piping (In Course of Preparation)	N/A
10	Dissimilar Metal Welds	November 22, 2002
11	Full Structural Overlaid Wrought Austenitic Piping Welds	November 22, 2001
12	Coordinated Implementation of Selected Aspects of Supplements 2, 3, 10 and 11	November 22, 2002
13	Coordinated Implementation of Selected Aspects of Supplements 4, 5, 6 and 7	November 22, 2002
14	Supplement 14: Qualification Requirements for Coordinated Implementation of Supplements 10, 2, and 3 for Piping Examinations Performed from the Inside Surface	November 22, 2002

Performance Demonstration Program

DNC will utilize personnel qualified through the Performance Demonstration Initiative (PDI) Program. PDI is an organization comprised of all the US nuclear utilities formed to provide an efficient, cost effective and technically sound implementation of Appendix VIII performance demonstration requirements.

Performance Demonstration Program Administrator

DNC will utilize the EPRI NDE Center as the Performance Demonstration Administrator (PDA) in accordance with the PDI Program Description Document (PDD), Revision 4 1.

Supplement 1: Evaluating Electronic Characteristics of Ultrasonic Systems
This Supplement defines the steps necessary to interchange the pulsars and/or receivers in an ultrasonic examination system without the need for requalification. The PDI Program does not support this activity, but PDI will supply DNC with technical guidance as required on a case-by-case basis.

Supplement 2: Qualification Requirements for Wrought Austenitic Piping Welds
The PDI Program is in full compliance with Supplement 2 as modified by 10 CFR 50.55a for examinations conducted from outside the piping. The PDI Program does not address examinations conducted from inside the pipe except for RPV nozzle-to-pipe welds. These examinations are included in Supplement 14, which is described later. Welds containing corrosion-resistant cladding (CRC) that is part of the pressure-retaining boundary, such as that typically applied to mitigate cracking are excluded. A recent Code inquiry indicates that these welds should be examined in accordance with Appendix III until qualification requirements are developed.

Supplement 3: Qualification Requirements for Ferritic Piping Welds

The PDI Program is in full compliance with Supplement 3 as modified by 10 CFR 50.55a for examinations conducted from outside the pipe. The PDI Program does not address examinations conducted from inside the pipe except for RPV nozzle-to-pipe welds.

Supplement 4: Qualification Requirements for the Clad/Base Metal Interface of Reactor Vessel
The PDI Program is in full compliance with Supplement 4 as modified by 10 CFR 50.55a.

Supplement 5: Qualification Requirements for Nozzle Inside Radius Section
The PDI Program is in full compliance with Supplement 5 as modified by 10CFR50.55a for examinations conducted from inside the reactor vessel.

The PDI Program is in full compliance with Code Case N-552 as modified by Regulatory Guide 1.147. For examinations conducted from outside the reactor vessel. Code Case N-552 is applicable to both the nozzle inside radius region and the inner 15% of nozzle-to-shell welds when scanning for flaws oriented transverse to the weld. Code Case N-552 requires that all nozzles be modeled, including the inner 15% of the nozzle-to-vessel weld, and introduces maximum metal path and maximum misorientation angles as new essential variables that must be qualified. Code Case N-552 is identified as an acceptable alternative in Regulatory Guide 1.147 and should be identified in the ISI Program. Modeling will be the responsibility of DNC.

Supplement 6: Qualification Requirements for Reactor Vessel Welds Other Than Clad/Base Metal Interface

The PDI Program is in full compliance with Supplement 6 as modified by 10 CFR 50.55a. In addition, the PDI Program considers that demonstrations conducted on clad vessel specimens in accordance with Supplement 4 exceed the requirements of Supplement 6 and may be used for examination of the inner 10% of unclad components without a relief request. Demonstrations performed on unclad vessel specimens, however, may not be used for the examination of clad vessels.

Supplement 7: Qualification Requirements for Nozzle-to-Vessel Welds

The PDI Program is in full compliance with Supplement 7 as modified by 10 CFR 50.55a. The title of this Supplement is somewhat misleading: originally intended as a stand-alone Supplement, the examination coverage requirements of 10 CFR 50.55a have resulted in this Supplement being applicable only to examinations conducted from the nozzle bore (for example, PWR inlet and outlet nozzles). Examinations of the inner 15% conducted from the outside for flaws oriented transverse to the weld are qualified according to Supplement 5 using Code Case N-552 as above. Otherwise, Supplement 4 and 6 are applicable.

Supplement 8: Qualification Requirements for Bolts and Studs

The PDI Program provides personnel only demonstrations for bolting. This demonstration covers a range of bolting types and sizes, using the typical equipment and other essential variables. Other variables to be used in each examination shall be demonstrated during calibration, prior to the examination.

Supplement 9: Qualification Requirements for Cast Austenitic Piping Welds

In accordance with Appendix VIII, specific qualification requirements are in the course of preparation, and the requirements of Appendix III are applicable.

Supplement 10: Qualification Requirements for Dissimilar Metal Piping Welds

The PDI Program is not in compliance with Supplement 10. PDI qualifications are conducted in accordance with Code Case N-695. This Code Case is identified in RG 1.147, as acceptable and should be included in the ISI Program. A relief request will be required if the examination procedure is incapable of depth sizing flaws to an accuracy of 0.125 root mean square (RMS).

Supplement 11: Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds

The PDI Program is in compliance with Supplement 11.

Supplement 12: Requirements for Coordinated Implementation of Selected Aspects of Supplements 2, 3, 10, and 11

The PDI Program is in full compliance with Supplement 12 as modified by 10 CFR 50.55a for the coordinated implementation of Supplements 2 and 3 for examinations conducted from the outside. It does not support the coordinated implementation of Supplements 10 and 11; these are performed on an individual basis. Supplement 14 is appropriate on a limited basis for examinations conducted from the inside surface.

Supplement 13: Requirements for Coordinated Implementation of Selected Aspects of Supplements 4, 5, 6, and 7

The PDI Program does not support this Supplement. Supplements 4, 5, 6, and 7 qualifications are performed on an individual basis.

Supplement 14: Qualification Requirements for Coordinated Implementation of Supplements 10, 2, and 3 for Piping Examinations Performed from the Inside Surface

Supplement 14 is functionally applicable only to PWR vessels. It is a new Supplement established by the PDI Program for a coordinated implementation of the qualifications required for the typical examinations performed from the ID of PWR nozzles. Supplement 14 uses the more technically stringent Supplement 10 qualification as a base and then incorporates a limited number of Supplement 2 and Supplement 3 samples. Qualification requirements for examination conducted from the inside surface are conducted in accordance with Code Case N-696.

Single Sided Access for Austenitic Welds

The Final Rule requires that if access is available, the weld shall be scanned in each of the four directions (parallel and perpendicular to the weld) where required. Coverage credit may be taken for single sided exams on ferritic piping. However, for austenitic piping, a procedure must be qualified with flaws on the inaccessible side of the weld. There are currently no qualified single side examination procedures that demonstrate equivalency to two-sided examination procedures on austenitic piping welds. Current technology is not capable of reliably detecting or sizing flaws on the far side of an austenitic weld for configurations common to US nuclear applications.

The PDI Program conforms with the Final Rule regarding single side access for piping. PDI Performance Demonstration Qualification Summary (PDQS) certificates for austenitic piping list the limitation that single side examination is performed on a best effort basis. The best effort qualification is provided in place of a complete single side qualification to demonstrate that the examiners qualification and the subsequent weld examination is based on application of the best available technology.

When the examination area is limited to one side of an austenitic weld, examination coverage does not comply with 10 CFR 50.55a(b)(2)(xv)(A) and proficiency demonstrations do not comply with 10 CFR 50.55a(b)(2)(xvi)(B) and full coverage credit may not be claimed.

DNC will document the affected austenitic welds for which best effort one sided exams are encountered and the percentage of the weld examined.

DNC will submit a request for relief of one sided examination of austenitic welds.

Credit will be taken for single sided access for ferritic welds and the weld shall be scanned in each of the four directions (parallel and perpendicular to the weld) where accessible.

Responsibilities

The Unit ISI Program Owner (DNC) is responsible for implementing the Appendix VIII program.

The Site Level III is responsible for certification and proficiency maintenance of NDE personnel.

ATTACHMENT 2

MILLSTONE POWER STATION UNIT 3
THIRD 10-YEAR INTERVAL INSERVICE INSPECTION (ISI)
RELIEF REQUESTS

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

10 CFR 50.55a Request Number IR-3-01

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1. ASME Code Components Affected

ASME Code Classes:	Code Classes 1, 2, 3 and MC
References:	ASME Section XI, IWF-5300 ASME/ANSI-OM (Part 4)
Examination Category:	N/A
Item Number:	N/A
Description:	Snubber Examination and Testing
Components:	Code Class 1, 2, 3 and MC Snubbers

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

IWF-5300 (a) states: "Inservice examinations shall be performed in accordance with ASME/ANSI OM, Part 4, using the VT-3 visual examination method described in IWA-2213."

IWF-5300 (b) states: "Inservice tests shall be performed in accordance with ASME/ANSI OM, Part 4."

IWF-5300 (c) states: "Integral and nonintegral attachments for snubbers, including lugs, bolting, pins, and clamps, shall be examined in accordance with the requirements of this Subsection."

Table IWA-1600-1 references ASME/ANSI-OM (Part 4) Revision 1987 with OMa-1988.

4. Reason for Request

OMa-1988 imposes surveillance requirements for visual inspection and functional testing of snubbers. A visual inspection is the observation of the condition of the installed snubbers to identify those that are damaged, degraded, or inoperable as caused by physical means, leakage, corrosion, or environmental exposure. To verify that a snubber can operate within specific performance limits, functional testing is required that typically involves removing the snubber and testing it on a specially designed test stand. Functional testing provides a 95% confidence that 90-100% of the snubbers operate within the specified acceptance limits. The performance of visual inspections is a separate process that complements the functional testing program and provides additional confidence in snubber operability.

The Code specifies a schedule for snubber visual inspections that is based on the number of inoperable snubbers found during the previous visual inspection. Because the current schedule for snubber visual inspections is based only on the number of inoperable snubbers found during the previous inspection, irrespective of the size of the snubber population, the visual inspection schedule is excessively restrictive. A significant amount of resources must be spent, and plant personnel subjected to unnecessary radiological exposure to comply with the visual examination requirements.

5. Proposed Alternative and Basis for Use

As an alternative to performing inservice examination and testing in accordance with ASME/ANSI OM, Part 4, as required by IWF-5300, Millstone Power Station Unit 3 (MPS3) will apply the visual and functional testing requirements that are prescribed by MPS3 Technical Specification 4.7.10 (including sampling and frequency requirements) to the snubbers identified above.

An alternate schedule for visual inspections has been developed that maintains the same confidence level as the existing schedule and generally will allow performance of inspections and corrective actions during plant outages. This schedule is given in Table 4.7-2, invoked from MPS3 Technical Specification 4.7.10.b. Because it will reduce future occupational radiation exposure and is highly cost effective, this is consistent with NRC policy. The alternative inspection schedule is based on the number of unacceptable snubbers found during the previous inspection in proportion to the sizes of the various snubber populations or categories.

While the schedule of examinations is to be determined from MPS3 Technical Specification 4.7.10, the examinations are still to be performed using VT-3 visual examination certified personnel.

6. Duration of Proposed Alternative

This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019.

7. Precedents

A similar alternative was approved for use at MPS3 during the second inservice inspection 10-year interval (see Relief Request IR-2-02), in NRC letter A15322, dated July 24, 2000, ADAMS Accession No. ML003730922.

10 CFR 50.55a Request Number IR-3-02

Relief Request

in Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Component(s) Affected

ASME Code Class:	Code Class 2
Reference:	ASME Section XI, Table IWC-2500-1
Examination Category:	C-B
Item Number:	C2.22
Description:	Relief from Volumetric Examination of Nozzle Inside Radius Sections of Main Steam Nozzles
Components:	Component Identification Numbers:
	03-053-SW-T-IR
	03-054-SW-T-IR
	03-055-SW-T-IR
	03-056-SW-T-IR

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

ASME Section XI 2004 Edition Table IWC-2500, Item C2.22 requires a volumetric examination of the nozzle inside radius of nozzles without reinforcing plate in vessels greater than ½ inch nominal thickness, as defined by Figure IWC-2500-4 (a), (b), or (d). In the case of multiple vessels of similar design, size, and service the required examinations may be limited to one vessel or distributed among the vessels.

4. Impracticality of Compliance

In evaluating the referenced ASME Code, the concern is that the inside radius of the Main Steam Nozzle is considered susceptible to flaw initiation and growth due to high thermal and mechanical stresses associated with the vessel and connected piping systems. In the case of the MPS3 steam generator nozzles, the nozzle is a one-piece forging containing a set of seven holes bored parallel to the nozzle centerline (see Figure 1 in Attachment 1). This nozzle design does not match the typical figures in Figure IWC-2500-4. Since the ligaments between the holes distribute the loads throughout the nozzle forging, the primary stress resulting from the pressure is significantly lower than those for a typical nozzle. The plate ligaments provide both reinforcement and additional insulation by directing the flow away from the nozzle inner radius. Furthermore, the local stresses resulting from the thermal gradients in the inner radius are expected to be low, since the nozzle is only exposed to saturated steam resulting in a low transfer between the nozzle and the coolant.

The design of the nozzles consists of seven, 8-1/2 inch bore holes, which precludes a meaningful ultrasonic examination of the area of interest. As a result, a volumetric examination is impractical.

The design of the nozzle precludes visual examination of the nozzle inside radius even if access to this area were possible. Access to the steam generator main steam nozzle from inside the steam generator is restricted by the upper deck plate and moisture separators; therefore, visual examinations from inside the steam generator are impractical.

The unique design of the steam generator main steam outlet nozzle results in low stresses when compared to nozzles with typical inner radius configurations. Stresses in the nozzle inner radius region are less than 68 percent of the ASME Code allowable for each design condition. This was determined by a review of a proprietary Westinghouse Steam Generator Stress Report. In addition, the stresses are considerably lower than those of other nozzles, such as the steam generator feedwater nozzle.

5. Burden Caused by Compliance

In order to provide access to perform an inner radius examination, significant modifications would have to be made to the current steam generator design. These modifications would be cost prohibitive and would yield little, if any, safety benefit.

6. Proposed Alternative and Basis for Use

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from the ASME Section XI requirements described above. Instead, Dominion Nuclear Connecticut (DNC) will perform visual examination during the system leakage tests as required by Section XI.

7. Duration of Proposed Alternative

This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019.

8. Precedents

Similar relief requests were approved for the First Interval (Relief Request IR-19) in NRC letter A12289, dated May 4, 1995 and the Second Interval (Relief Request IR-2-05) in NRC letter A15322, dated July 24, 2000, ADAMS Accession No. ML003730922.

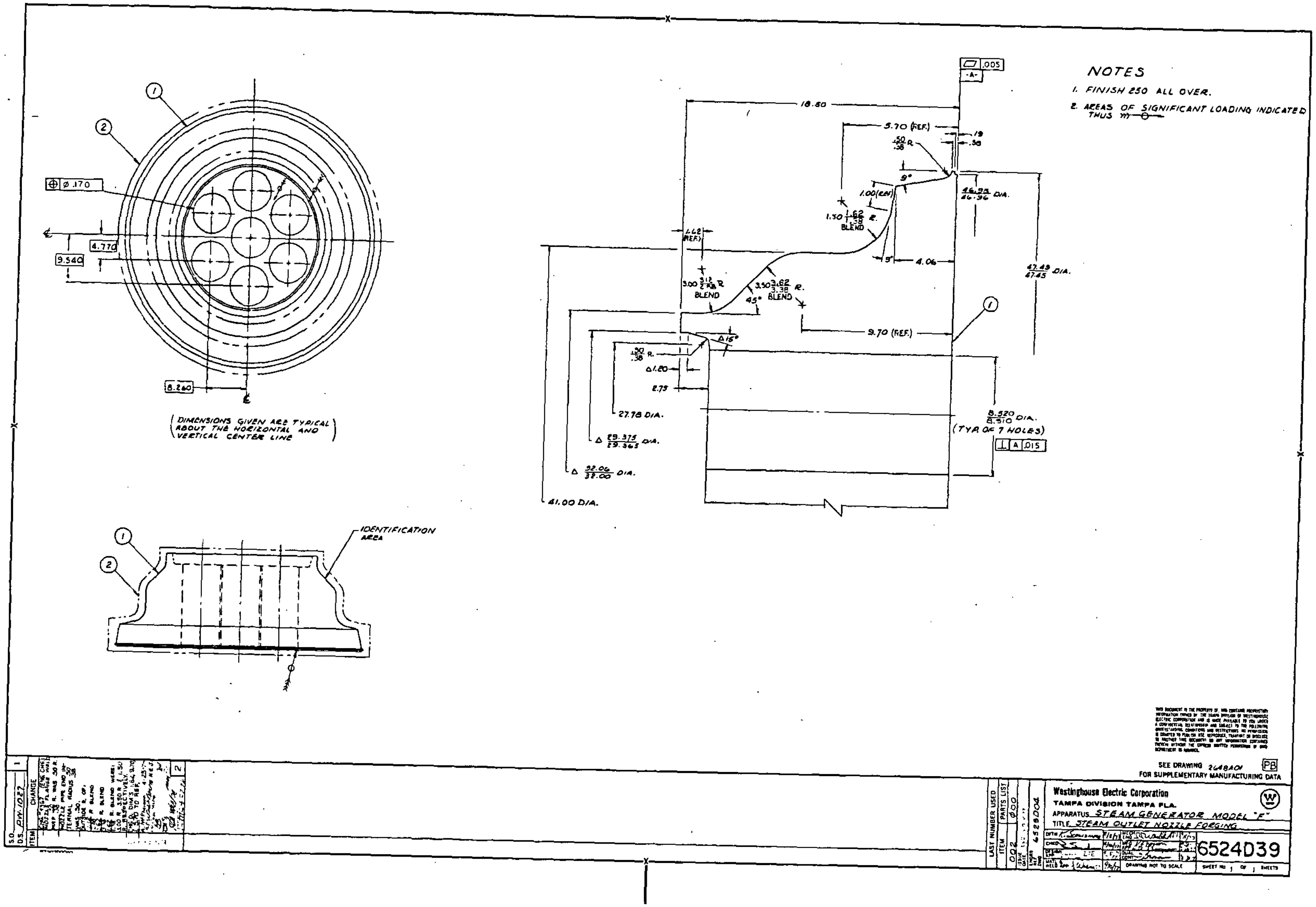

Figure 1: Steam Generator Steam Outlet Nozzle Forging

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1. ASME Code Components Affected

ASME Code Class:	Code Class 3
References:	ASME Section XI, IWA-4000, IWA-5250 and IWD-3000
Examination Category:	N/A
Item Number:	N/A
Description:	Alternative Brazed Joint Assessment Methodology
Components:	Service Water System Brazed Piping Joints, 3 inches Nominal Size and Smaller

Figure 1 in Attachment A shows a typical brazed joint. Attachment B provides additional details concerning applicable brazed joint materials, configuration and brazing.

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

If leakage of a Class 3 brazed connection is discovered during the course of normal operation, IWA-4000, Repair/Replacement Activities, applies and the joint must be repaired or replaced in accordance with that article. However, if the leakage is discovered during a scheduled leak test, the joint must be evaluated and repaired in accordance with IWD-3000 as clarified by the following:

- IWD-3000 does not have acceptance criteria for Class 3 components. IWD-3500, "ACCEPTANCE STANDARDS" refers to IWC-3500, "ACCEPTANCE STANDARDS". IWC-3516, "Examination Category C-H, All Pressure Retaining Components" states, "These standards are in the course of preparation. The standards of IWB-3522 may be applied."
- IWB-3522.1 establishes the acceptance standard for Visual Examination, VT-2, in which leakage of non-insulated and insulated piping is listed as a relevant condition. IWB-3522.1 states that such relevant conditions that may be detected during the conduct of system pressure tests shall require correction to meet the requirements of IWB-3142 and IWA-5250 prior to continued service.
- IWA-5250, "Corrective Action," in the context of a system leak test, requires identification of the source of leakage for evaluation of its corrective action which may include repair/replacement activities.

- IWB-3142, "Acceptance," permits acceptance of visually identified conditions under the requirements of IWB-3142.2, "Acceptance by Supplemental Examination."
- IWB-3200, "SUPPLEMENTAL EXAMINATIONS," permits supplemental surface or volumetric examinations to determine the extent of the unacceptable conditions and the need for corrective measures, repairs, analytical evaluation, or repair/replacement activities.

4. Reason for Request

In the course of plant operation, brazed joints are sometimes observed to be leaking at very low rate ("weepage") through a defect in the braze bond between the pipe and fitting. Applicable Code requirements depend on whether the leak is discovered in the course of normal plant operation or during a scheduled leak test.[1]

Section XI and Section III of the ASME Code do not have rules applicable to evaluation of weepage through brazed joints caused by defects in braze bonding between piping and fittings. Section XI, IWD-3000, has no acceptance standards and refers to the rules of IWB-3000. However, IWB-3000 has no rules pertaining to brazed joints. Therefore, Section XI does not have rules specific to examination and acceptance of relevant conditions observed in brazed joints. Lacking such rules, the leaking joint must be repaired in accordance with IWA-5250(a)(3) if found during a Code required system leakage test or IWA-4000 during any other mode of system operation.

A safe alternative to the requirement to immediately repair a brazed joint with leakage can include a deferred, but planned, repair/replacement activity that permits continued plant operation based on an evaluation of continued acceptable integrity and functionality of the brazed joint. With this approach, sections of piping containing brazed joints can be replaced with welds or flanges in a systematic and planned manner and without unnecessary unavailability of safety related systems or components as well as unnecessary plant shutdowns.

5. Proposed Alternative and Basis for Use

It is proposed that in lieu of the immediate repair requirement of IWA-5250 or IWA-4000, DNC perform a supplemental ultrasonic test (UT) examination and comparison with alternative acceptance criteria. The UT examination will establish the extent of braze bond within the joint. The UT results will be compared with pre-established brazed joint bond levels required for structural integrity of the specific piping under consideration and that account for the design basis loadings applicable to the condition. This will establish the basis for determining joint integrity to the extent required for system operability.

The lack of full braze bonding originates from construction, or fabrication, and is not progressive over time. However, the proposed methodology provides for continued monitoring until a resolution of the nonconforming condition (e.g., weepage) occurs through repair/replacement activities. Periodic monitoring of the joint and its leakage verifies that

[1] ASME Code Interpretation XI-1-92-19

assumptions used for the assessment remain valid. The overall methodology has been validated by performance of physical testing on an array of simulated bond configurations, as well as several brazed joints salvaged from MPS3 piping. Consequently, the request provides an acceptable level of quality and safety commensurate with the original licensing and design basis of MPS3 as well as the provisions of 10 CFR 50.55a(a)(3)(i).

5.1 SCOPE:

The alternative is limited to brazed service water piping (typically constructed of copper-nickel or Monel piping and cast bronze fittings) or on-skid equipment piping that has a design pressure of 150 psig or less and a design temperature of 150 degrees Fahrenheit or less. The piping nominal size is limited to three inches maximum.

Basis:

The limitation of pipe sizes to three inches or less ensures that the alternative is applied to piping for which it was intended, and is comparable to the range of pipe sizes (2 and 3 inches) included in the physical testing described in Attachment D. The limitation to service water systems ensures that the operating pressure and temperature are well within the moderate energy range. The fluid contents of the piping are comparable to the ones examined for potential corrosion effects.

5.2 EXAMINATION

As permitted by IWB-3200, "Supplemental Examinations," the brazed joint will be examined by UT using a straight beam technique that monitors the relative strengths of signals returned from the internal diameter (ID) of the pipe and the fitting. This technique was derived from and is consistent with the technique standardized by the U.S. Navy for use on brazed shipboard piping.[2]

The UT procedure in Attachment E is provided for reference only and is subject to change. The UT procedure will require that technicians be certified in accordance with ANSI / ASNT CP-189, 1995 Edition. Only Level II or III certified technicians may perform or review the braze readings and they must be familiar with brazed joint geometry and signal response characteristics. As a prerequisite, the examination surface must be suitably prepared to obtain satisfactory sound transmission. The joint circumference is marked at a number of locations such that they are spaced no greater than 1 inch apart. For the actual examination a straight beam longitudinal wave signal is required. At each marked location the percent bond is recorded based on the relative strengths of signals received from the pipe ID and fitting ID. The procedure provides instructions to distinguish between fittings of the "face fed" and "insert" type, the latter of which have an internal groove in which a ring of braze filler material is inserted before brazing.

The MPS3 UT procedure will provide for documentation of the braze bond readings on suitable data sheets which also include the calibration data. The data sheets are reviewed

[2] NAVSEA 0900-LP-001-7000, "Fabrication and Inspection of Brazed Piping Systems", dated January 1, 1973.

by a certified Level II or III reviewer. The data sheets are then forwarded to Engineering for assessment.

<u>Basis for Nondestructive Examination Technique:</u>

The alternative UT examination is based on requirements tor UT examination contained in the U.S. Navy standard for brazed piping. It uses basic straight beam UT technology, and was utilized to confirm the quality of critical piping systems in the submarine fleet of the U.S. Navy. A brazed joint is considered acceptable without further evaluation by the standard if the average bond is 60 percent or more.

Consistent with the reference standard, the MPS3 procedure will require this work to be performed by certified UT technicians, using calibrated equipment and approved couplants. It will require examination at multiple locations around the circumference of the fitting. It will require review of the data by a Level II or III technician. The UT procedure will be reviewed and approved by a Level III technician in accordance with Dominion quality requirements.

Previous trial demonstrations show that individual bond readings at a location on the fitting may vary but the average reading is consistent among qualified examiners.

5.3 ASSESSMENT

An assessment of the joint using this methodology includes the following considerations:

- system performance and indirect effects assessments,
- adjustment of bond readings to account for uncertainties,
- a review of design basis stress analysis of the piping to determine required joint strength,
- comparison of the adjusted bond readings with the prequalified bond levels that have been shown empirically by physical testing to assure structural integrity.

5.3.1 SYSTEM EFFECTS

As a prerequisite to structural assessment, knowledgeable engineering personnel assess the effect of the leak on the system and other nearby equipment. Typically a brazed joint with a defect in the braze material bonding will leak only drops per minute. The actual leak rate will be estimated and compared to service water system margins for loss or diversion of flow. In addition, a walkdown will be performed to identify any nearby equipment that may be affected by dripping or impingement spray from the leak. If required, a drip collection device or spray shield will be installed and maintained for the duration that the leak continues.

<u>Basis:</u>

ASME Code, Section XI code cases such as N-513-2 permit continued operation of low energy systems with minor leakage when justified by evaluation of system performance. Similarly, the proposed alternative permits continued operation provided that the leakage rate will not adversely affect required flows and the leakage or spray will not adversely affect safety related equipment. Typical flow from a weeping brazed joint is in terms of drops per minute. Even in a theoretical worst case of a joint having a total lack of braze material, the close tolerance between the pipe and fitting prevents significant flow. The total diametric clearance of a braze joint is about 0.005 inches. For a 3 inch pipe, the maximum possible flow area would be nominally 0.28 square inches (e.g., 3.14 x 3.5 x 0.0025) through which the upper bound flow rate at 100 psig would be about 6 gpm, a very small rate in comparison to service water pump capacity. More realistic estimates and actual leak rates would be much lower. Therefore, the maximum potential for braze joint leakage is very small. In addition, the proposed alternative requires a specific evaluation to assure that leakage does not unacceptably reduce system margins. Therefore, the system will meet all functional requirements and maintain an equivalent level of quality and safety.

5.3.2 ACCEPTANCE THRESHOLD AND ADJUSTMENT OF BOND READINGS

If the average measured bond reading is 60 percent or above, then no further assessment is required since the bond strength exceeds piping strength. If the average is less than 60 percent, then the bond readings as documented in the UT procedure are adjusted downwards on a sliding scale, such that all readings at 10 percent and below are assumed to be zero, and readings above 10 percent are adjusted using the following formula:

$$b_{adj} = 100 \times (\text{reading} - 10)/(100 - 10) \qquad \text{units of percent}$$

For example, a 50 percent UT reading would be adjusted to 44 percent bond level for assessment purposes. For simplicity, the adjustment may be applied to the average of the UT readings, or alternatively to each of the UT readings prior to averaging. The average of the adjusted readings is then used for assessment purposes. For bond readings that are significantly non-uniform around the circumference of the braze, an effective (lower) bond is computed based on the equivalent moment of the adjusted bond areas.

If the average adjusted bond reading is above 55 percent then the joint strength is considered equal to or better than the piping and steps 5.3.3 and 5.3.4 below are skipped.

<u>Basis for acceptance threshold and adjustments of readings:</u>

Acceptance of average UT bond readings of 60 percent or more is the same as the acceptance criteria in the U.S. Navy standard that has been used for critical shipboard piping systems. The U. S. Navy criteria are applicable to systems rated 300 psig and greater. The 60 percent threshold criterion is therefore conservative for systems with design conditions 150 psig or less. For further confirmation of the 60 percent threshold, testing has shown that if true bond in the joint exceeds

30 percent then the piping collapse load occurs before any bond failure. The testing performed for MPS3 is described in Attachment D. There is no braze bond failure mode because the piping deforms plastically to relieve the imposed load, and this occurs at loads greater than the maximum load permitted by the licensing basis analysis of the piping. The downward adjustment of bond readings, beyond what is required by the U.S. Navy standard, is an introduced conservatism used to help correlate the data from actual piping samples and accounts for uncertainties in bond readings.

5.3.3 CONSTRUCTION CODE QUALIFICATION STRESS ANALVSIS REVIEW

The Construction Code qualification stress analysis of record is reviewed to determine design basis loadings at the subject braze joint. Pressure, deadweight, and safe shutdown earthquake (SSE) loadings are included. The loads are either used directly or expressed in terms of equivalent pipe stress so that stress analysis outputs may be used directly. The stress intensification factor (SIF) that may have been applied in Construction Code stress analysis is not required to be included in the summation of nominal stresses used for assessment.

Basis for Stress Analysis Review:

The review of stress analysis required by this proposal is a data gathering activity required to determine the primary loads imposed on the brazed joint. The primary loads consist of maximum operating pressure, deadweight, SSE seismic, and any transient dynamic loads that have been defined for the piping. Since the stress analysis is the calculation of record for qualifying the piping in accordance with licensing basis requirements, it is an acceptable source of input for assessing the structural integrity of brazed joints.

The use of Construction Code stress values implicitly treats piping torsion loads as equivalent to bending moments. This is conservative because in the bonded joint the torsional shear is actually half that calculated on an equivalent pipe stress basis.

5.3.4 COMPARISON OF ADJUSTED BOND TO REQUIRED BOND

Equation 3 in Figure 2 of Attachment A was developed to give the allowable loading for an equivalent bond level. The equation is used for a comparison that is needed only when the average bond is less than 60 percent. When an equivalent adjusted bond of a brazed joint is determined, as described in section 5.3.2, an allowable loading ($S_{max}(b_{adj})$) can be obtained from the equation. This is the safe loading level that the joint can withstand. If the joint load demand that has been determined in section 5.3.3 is less than the allowable ($S_{eq} < S_{max}(b_{adj})$), then the brazed joint is concluded to have adequate structural integrity for continued service. The comparison is quantified as shown in Figure 2.

An example of a structural assessment performed for a hypothetical leaking brazed joint is included in Attachment C. The example is for a joint with 55 percent average measured bond, which is adjusted to an effective minimum bond of 43 percent for bending loads. This effective bond level results in a joint load capability of 11.0 ksi nominal pipe stress. The 11.0 ksi load capability is adequate for the design basis loads of this example since the joint load demand is only 4.4 ksi. Therefore, the example structural assessment concludes the joint can be left in service provided it is monitored until its permanent repair/replacement activity is completed.

If a joint does not have adequate bond by this assessment, this comparison for determining the adequacy of structural integrity of the joint is not applicable. Prompt repair/replacement of the joint, or temporary non-Code repairs subject to NRC review and approval may still be an option, consistent with considerations in Regulatory Issue Summary 2005-20 for the resolution of degraded and nonconforming conditions.

<u>Basis for Comparison of an Adjusted to Required Bonding:</u>

Brazed joints with reduced bond levels can retain a significant strength that is adequate for the structural integrity of the joint. Dominion has sponsored tests at an independent testing facility to demonstrate the correlation between reduced bond levels and joint strength. The tests and their results are described in Attachment D.

The correlation developed by the testing conservatively determines a required bond level for a given intensity of joint loading. The results of these tests support the use of the comparison shown in Figure 2 of Attachment A for the structural integrity analysis.

The estimated joint strength obtained using Equation 3 in Figure 2 is confirmed conservative by test results. Each of the tested joints achieved a collapse load well above that which would be predicted for a 5 ksi braze shear strength. This also confirms the conservatism of the 5 ksi maximum braze shear stress assumption that is used as an input to the Equation 3, shown in Figure 2.

With the adjustment of bond readings imposed by this methodology, and a joint load capacity that is based on a 5 ksi shear stress, the tests demonstrate that a margin of greater than 1.5 exists between test results and estimated allowable joint load capacity from the actual piping removed from plant service. This margin provides an equivalent factor of safety (FS) to that provided by the ASME Code, Sections III and XI.

The ASME Code, Section III, Appendix F has been accepted by the NRC for evaluation of degraded conditions.[3] Appendix F, paragraph F1331.1 (a) permits primary stress at levels up to $0.7S_u$ and in paragraph (c) it permits primary membrane plus bending stress at levels up to $(1.5)(0.7S_u) = 1.05S_u$. These result in a maximum FS of 1.4 relative to ultimate strength. In shear across a section, paragraph F1331.1 (d) limits shear to $0.42S_u$ for a FS of 1.37 relative to $(1 / \sqrt{3})S_u$.

[3] Generic Letter 91-18, Rev. 1, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions," October 8, 1997.

The 5 ksi shear limit used at the braze bond is well below this Appendix F limit of $0.42S_u$.

The ASME Code, Section XI permits acceptance of planar flaws for which Appendix C in paragraph C-3320(b) requires a safety factor of 1.39 for circumferential flaws, and paragraph C-3420(a) requires a safety factor of 1.50 for axial flaws, both for emergency and faulted loads. These same safety factors are also permitted in Code Case N-513-1, which has been accepted by the NRC for evaluation of flaws.

Considering the ASME Code references described above, a FS of 1.5 for design basis loadings in ductile materials provides an equivalent and acceptable level of safety as compared to the plant design basis and permitted methodologies for evaluation of flaws.

5.4 MONITORING:

The proposed alternative assessment methodology requires periodic monitoring to assure that the assumptions of the assessment remain valid. This monitoring will be in addition to the normal daily plant operator rounds during which personnel are observant for signs of leakage. The monitoring will be by visual observation of the appearance of the joint and its leak rate. The frequency of the monitoring will be approximately once every three months, not to exceed 120 days between observations. The monitoring will continue as described until the joint is repaired or replaced. If there are changes in the nonconforming condition of an evaluated brazed joint with weepage that may impact its assessment for adequate structural integrity or its functionality, a Condition Report will be generated in accordance with the Millstone Power Station Corrective Action Program and the UT readings on the joint will be repeated and reassessed.

Monitoring Basis:

The degree and frequency of periodic monitoring is conservative because the braze defect that permits this form of leakage stems from original construction, or fabrication, and is not the result of a progressive degradation mechanism. Conditions that are applicable to the use of this methodology stem from defects in braze material inside a socket joint and will have a very low leak rate. Leakage is commonly considered weepage, at drops per minute or simply the appearance of moisture and salt deposits.

In MPS3 operating experience, there have been no conditions where the piping disengaged from brazed fitting sockets. Consequently, no conditions have been observed that would have impacted the ability to maintain adequate system flow. This positive operating experience is due to the inherent structural integrity of brazed joints in service water systems.

To further address the potential for degradation, a search and review of external operating experience was performed. Braze failures in closed loop and electrical cooling systems such as generator stator cooling have been attributed to corrosion. However, there was no operating experience indicating progressive failure for open loop seawater systems. To confirm the conclusion that no progressive failure mechanism applies, DNC had two specimens that had already been removed from Millstone Power Station seawater service, and that were reported to have low bonding, disassembled and examined. The surface examination of the separated fitting and pipe surfaces did not reveal evidence of braze metal corrosion product. Since these examined joints are typical of plant construction and have seen nearly 20 years of service with no degradation of the bond, it is concluded that periodic visual monitoring of leak rate for this condition is acceptable, and monitoring may be scheduled on a quarterly basis. The specified response to altered conditions such as increased weepage will ensure that degradation to system functional margins does not occur.

5.5 REPAIR / REPLACEMENT:

If the assessment can conclude that a brazed joint with leakage retains adequate structural integrity and functionality, an operability determination can be used to document an operable but not fully qualified status. A timely repair/replacement activity can be planned, commensurate with safety, and in accordance with 10 CFR Part 50, Appendix B. Consistent with the Millstone Power Station Corrective Action Program, the permanent Code repair/replacement for this nonconforming condition will be considered timely when completed during the next cold shutdown of sufficient duration, or the next refueling outage, whichever comes first. However, a time frame for a repair/replacement activity that could exceed the next refueling outage interval will be explicitly justified in the operability determination depending on factors that can include the time required for design, review, approval, or procurement of materials, availability of equipment, or the need to be in a hot or cold shutdown mode to implement the action.

If a joint does not have adequate bond by this assessment, the methodology for determining the adequacy of structural integrity of the joint is not applicable. Prompt repair/replacement of the joint, or temporary non-Code repairs subject to NRC review and approval may still be an option, consistent with considerations in Regulatory Issue Summary 2005-20 for the resolution of degraded and nonconforming conditions.

<u>Basis</u>:

The bases for continued operation prior to repair of the joint are: system functionality is maintained as justified in section 5.3.1 above, structural integrity of the joint is maintained as justified in section 5.3.4, and there is no progressive braze bond failure mechanism that would alter these conclusions over time. Compensatory actions for the condition are administratively controlled under the Millstone Power Station Corrective Action Program. These include but are not necessarily limited to the periodic monitoring of leakage for the condition or housekeeping measures to contain weepage from affected piping. The application of this methodology will be consistent with considerations of Regulatory Issue Summary 2005-20 for the resolution of degraded and nonconforming conditions. The permanent repair/replacement of the brazed joint assessed using this methodology will be in accordance with ASME Code, Section XI, IWA-4000.

5.6 AUGMENTED EXAMINATION:

Up to five similar brazed joints will be selected for augmented leakage examination. The additional joints will be selected based on consideration of adjacency, opposite train, fitting type, or other factors that may be evident from the specific condition. Selection of fewer than five joints for an augmented examination is acceptable if the population of similar joints not previously examined is fewer than five. If leakage is observed in similar joints, the resolution of each nonconforming condition will be evaluated in accordance with the Millstone Power Station Corrective Action Program, and the extent of condition will be documented and addressed.

Basis:

The examination of the additional joints is consistent with current practice for the resolution of degraded and nonconforming conditions, (e.g., application of ASME Code Case N-513-2). Augmented examinations provide information regarding the extent of condition being evaluated and are consistent with current Millstone Power Station procedures for responding to leakage in service water piping.

6. Duration of Proposed Alternative

This proposal requests approval for the use of an alternative brazed joint assessment methodology for the third 10-year Inservice Inspection (ISI) interval, which starts on April 23, 2009, and is scheduled to be completed on April 22, 2019.

7. Precedents

A similar request for relief was granted in the Second Interval (Relief Request IR-2-38) per letter 07-0153 dated February 28, 2007, ADAMS Accession No. ML070580514

FIGURES

DOMINION
MILLSTONE POWER STATION UNIT 3

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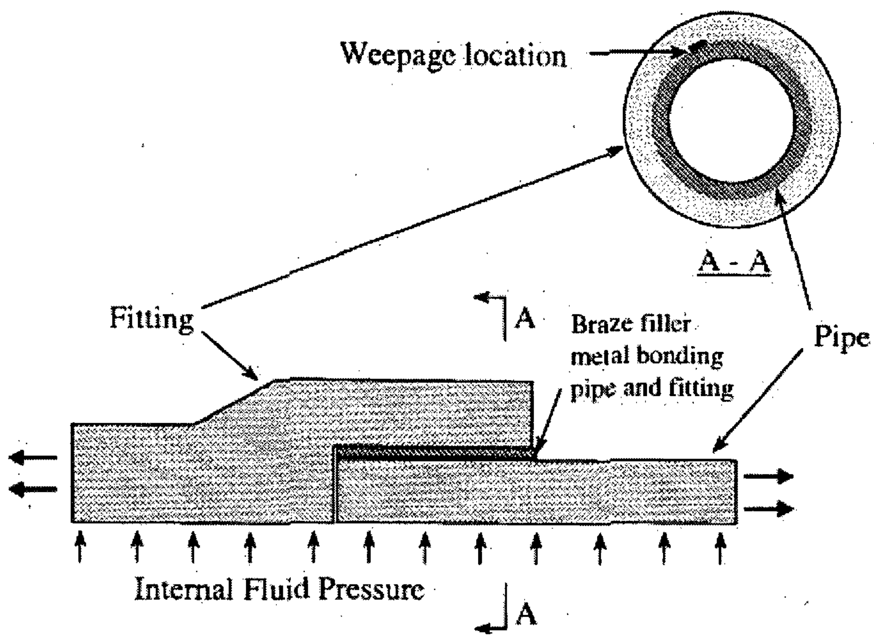


Figure 1: Typical Brazed Joint Configuration

$$S_{eq} < S_{max}(b_{adj}) \qquad (1)$$

$$S_{eq} = S_{lp} + S_{dl} + S_{sse} + S_{dyn} \qquad (2)$$

S_{lp} = longitudinal pressure stress

S_{dl} = deadload stress

Unintensified pipe stresses from Code qualification analysis

S_{sse} = SSE seismic stress

S_{dyn} = dynamic stress (if defined)

$$S_{max}(b_{adj}) = \frac{\pi}{4} \frac{D^2 \cdot L_{ins} \cdot \tau_{max}}{Z_{pipe}} \cdot b_{adj} \qquad (3)$$

D = pipe outside diameter

L_{ins} = insert depth of fitting socket excluding any insert groove

Z_{pipe} = piping section modulus

τ_{max} = 5000 psi (maximum braze shear stress)

b_{adj} = adjusted effective bond

Figure 2: Equations for Brazed Joint Assessment, Comparison of Brazed Joint Load vs. Capacity

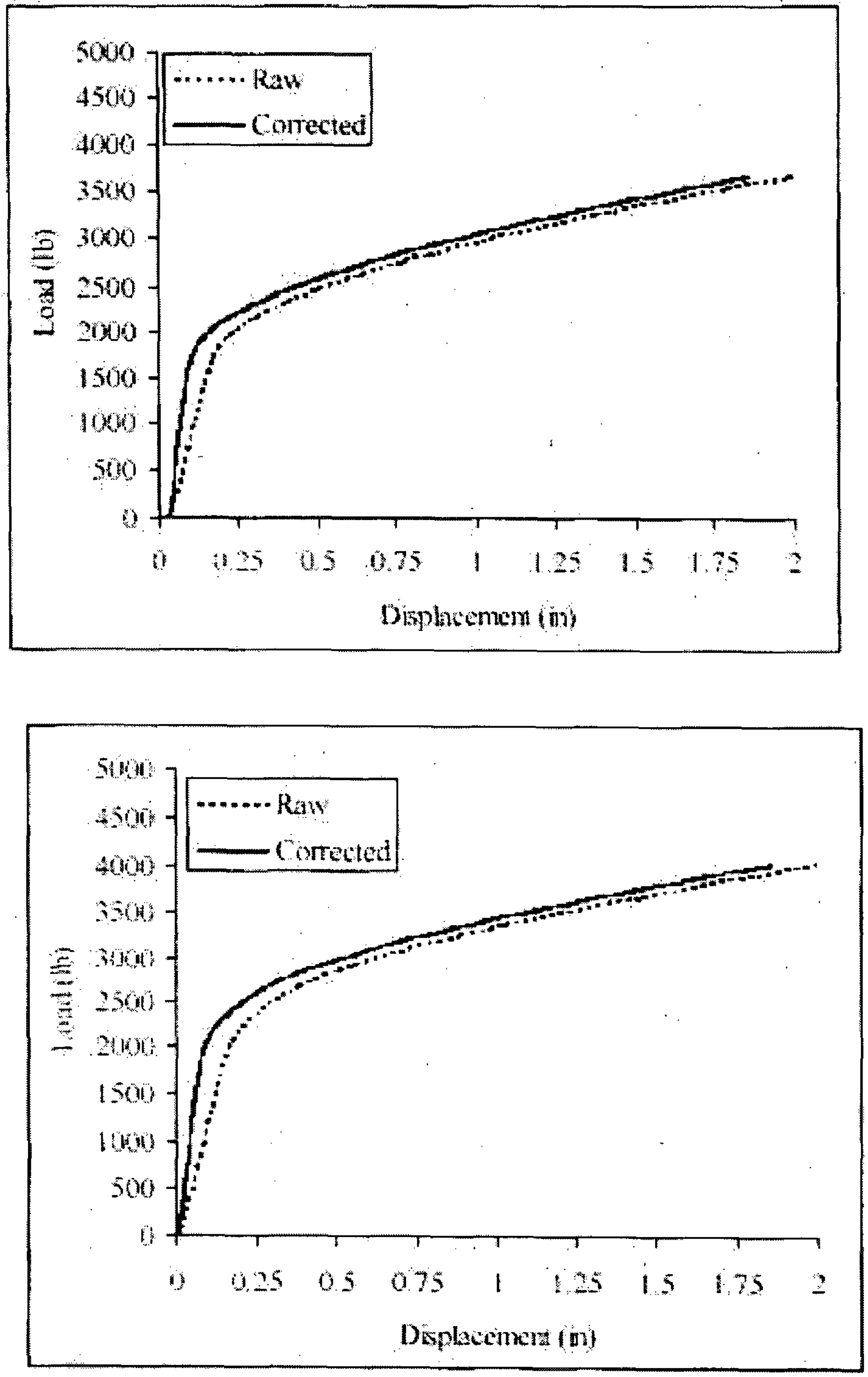


Figure 3: Two Inch Couplings: Fabricated Samples at (a) 30% (above) and (b) 60% bond

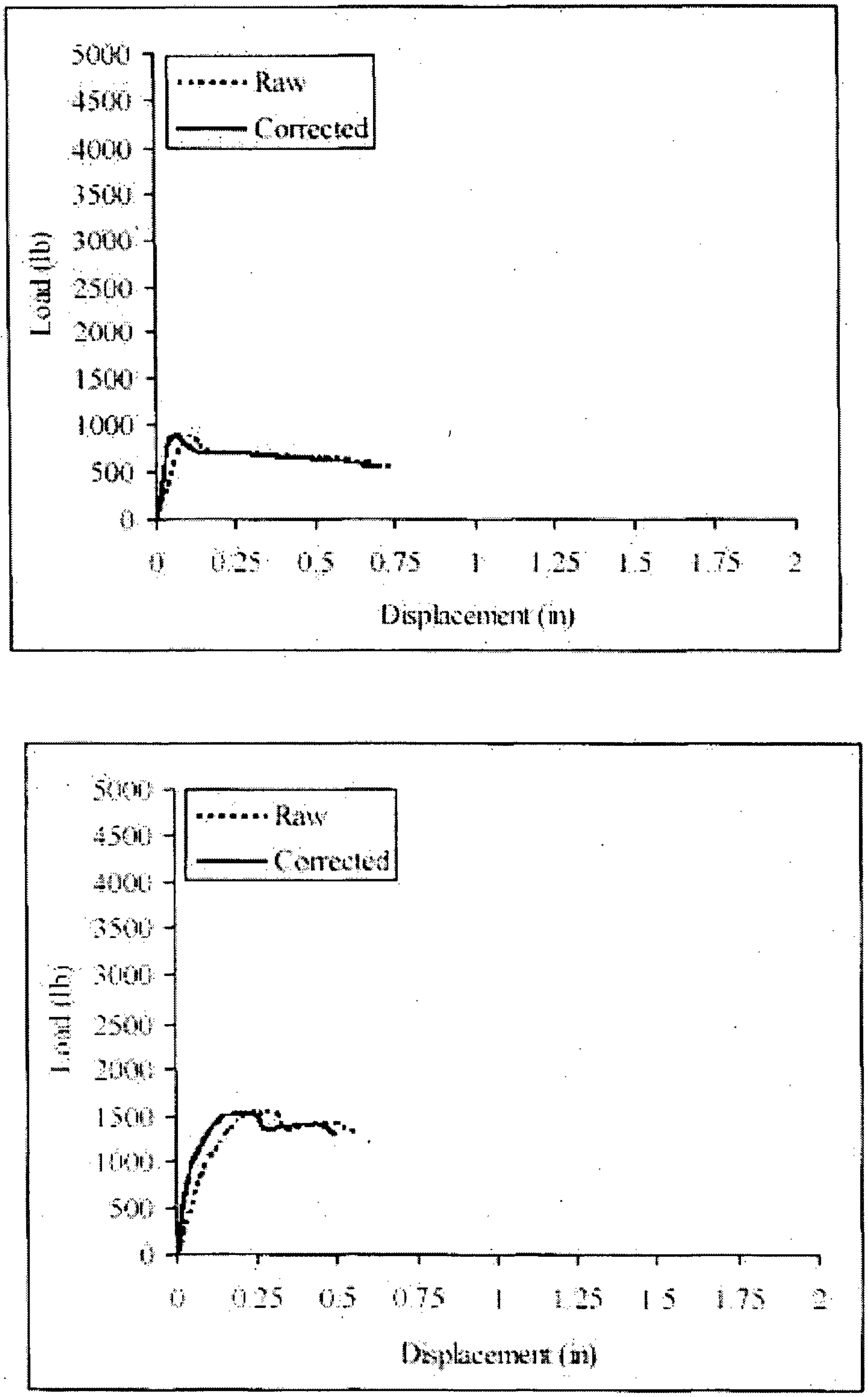
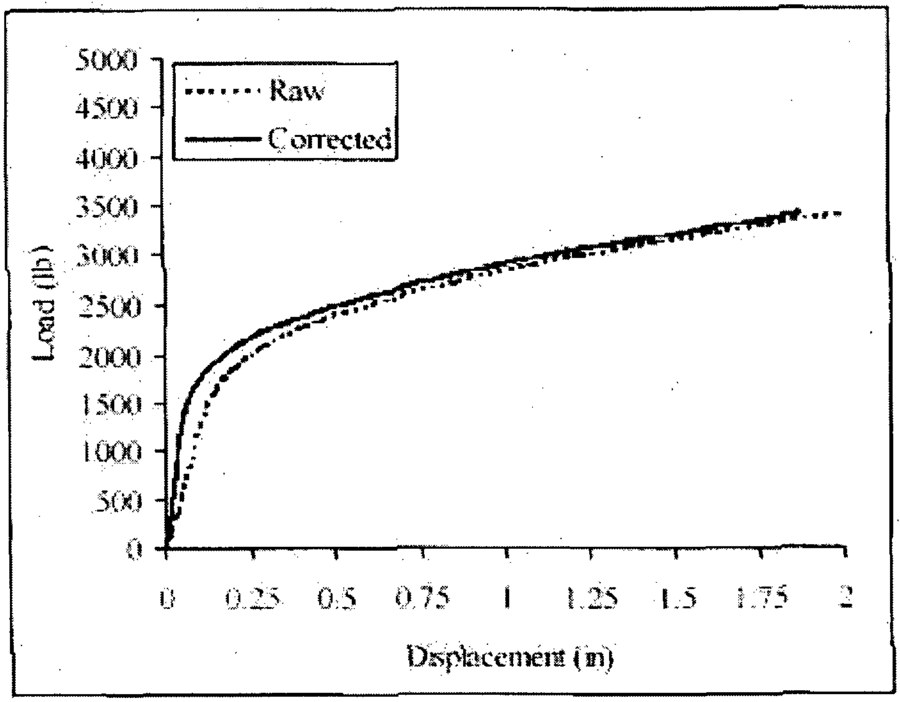


Figure 4: Two Inch Joints: Two Fabricated Samples with 12% Bond



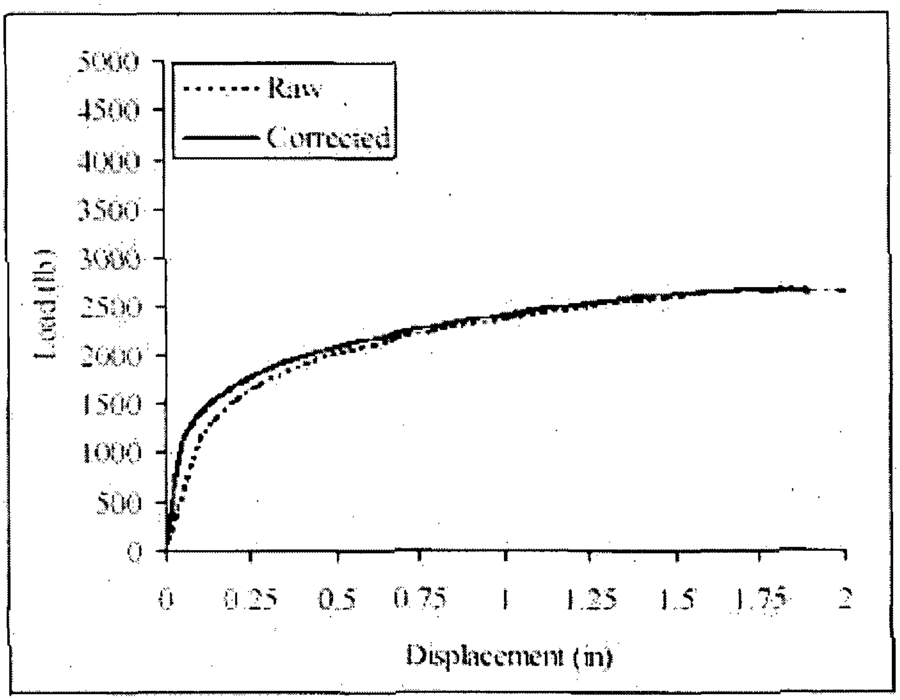


Figure 5: Arc Segment Disbondment, (a) 90 (above) and (b) 126 Degrees Arc

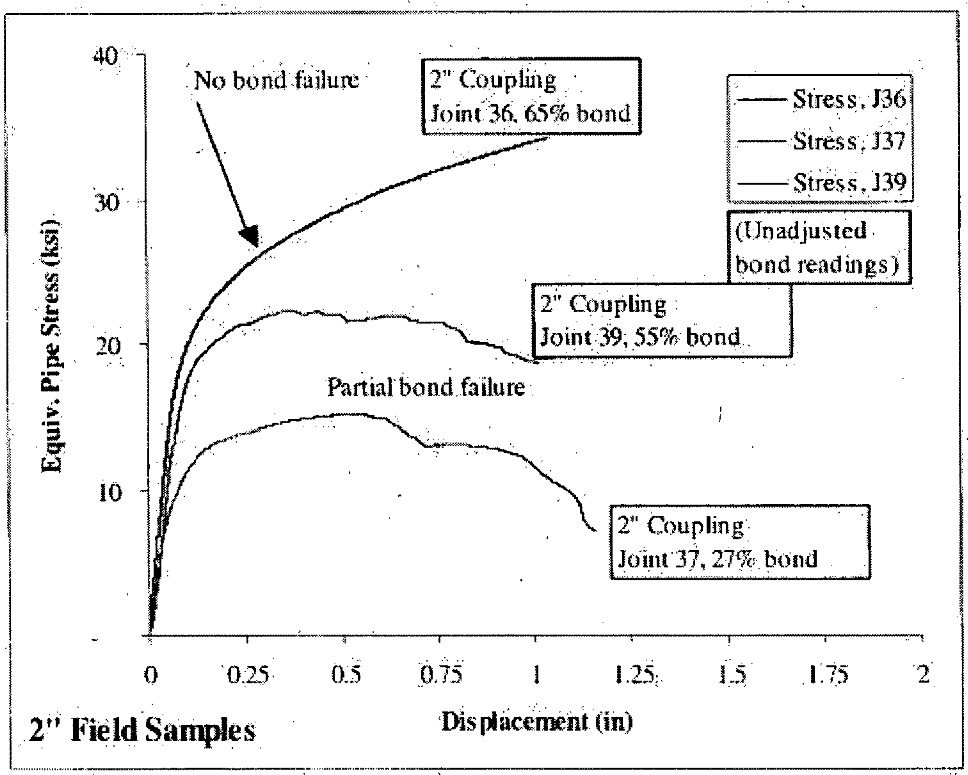


Figure 6: Two Inch Braze Field Sample Test Curve

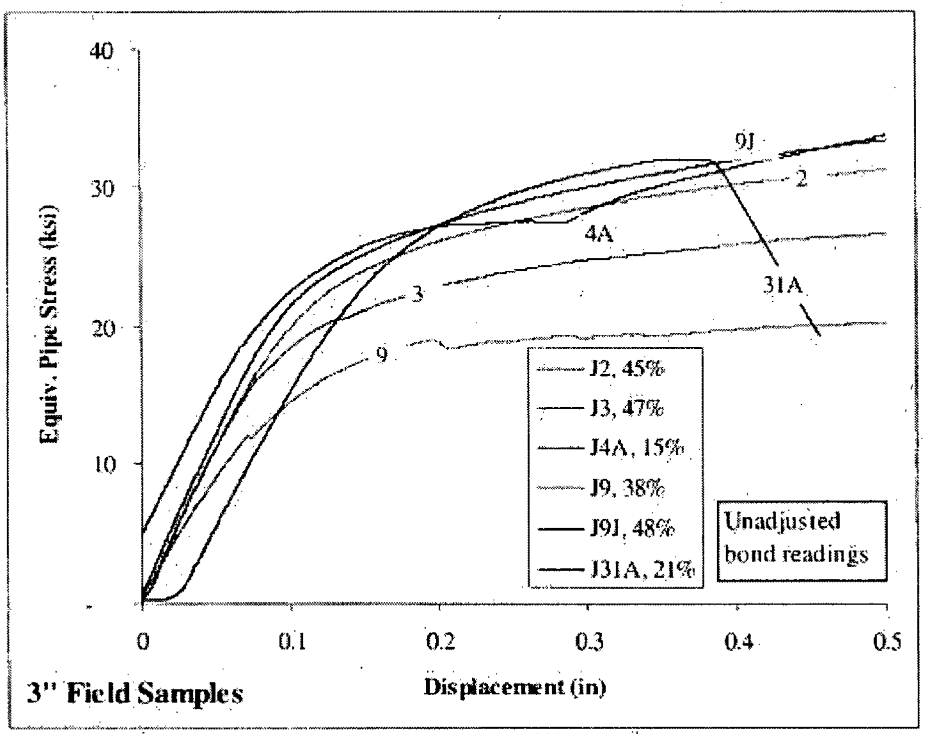


Figure 7: Three Inch Braze Field Sample Test Curve

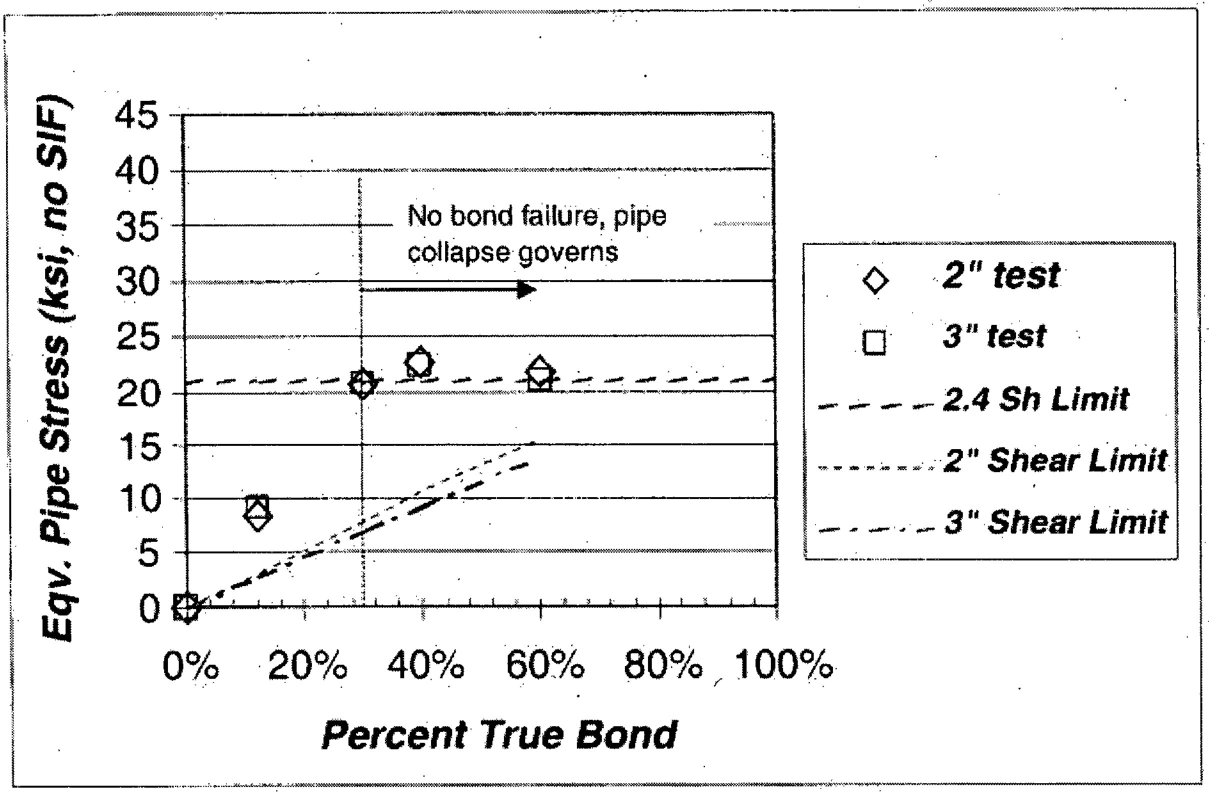


Figure 8: Test Results for Specially Fabricated Joints

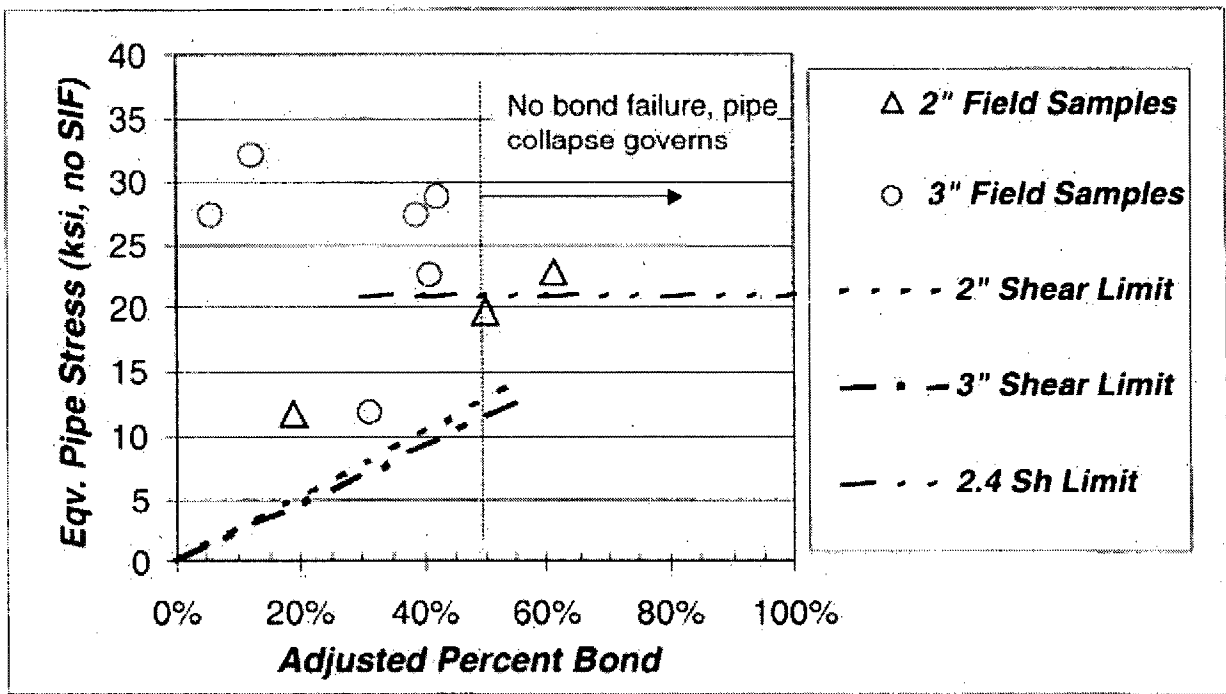


Figure 9 - Test Results for Joints Removed From Service

BRAZED JOINT CONFIGURATION AND MATERIALS

DOMINION
MILLSTONE POWER STATION UNIT 3

BRAZED JOINT CONFIGURATION AND MATERIALS

1.0 MATERIALS:

Typical materials of construction of brazed piping are copper-nickel (SB-466) or nickel alloy (SB-165) annealed piping, and cast bronze fittings and valves (SB-61 or SB-62) dimensioned to MIL-F-1183. The brazing alloy is SFA 5.8 BAg-1, BAS-1a, or BAg-7. Construction Code minimum properties of the piping and fitting materials are:

Material	Item	Sh, ksi	Yield, ksi	Ultimate, ksi
SB466 CDA706	Pipe	8.7	13	38
SB-165	Pipe	17.5	28	70
SB-61	fitting	8.5	16	34
SB-62	fitting	7.5	14	30

2.0 CONFIGURATION:

As shown in Figure 1 of Attachment A, a typical brazed joint fitting has a deep socket for inserting the pipe. Although it appears similar to a socket welded joint, the fabrication and structural behavior are quite different. Whereas the socket weld achieves its joint strength by a fillet weld, resulting in fusion of similar material between the pipe and the outer face of the fitting, the braze achieves its strength by surface bonding of the outside of the pipe to the inside of the fitting socket using a dissimilar metal braze filler of silver alloy. The resulting braze filler metal is very thin (approximately 1 to 5 mils). The load transfer between pipe and fitting is thus primarily by shear through the braze filler. It is noted that there is no inherent stress concentration factor like that normally applicable to socket welds because there is no significant pipe wall bending induced by the shear load transfer over a length that is several wall thicknesses long.

The following has been excerpted from a standard piping handbook.[4]

> *The length of lap in a joint, the shear strength of the brazing alloy, and the average percentage of the brazing surface area that normally bonds are the principal factors determining the strength of brazed joints. The shear strength may be calculated by multiplying the width by the length of lap by the percentages of bond area and by taking into consideration the shear strength of the alloy used.*

For the standard braze joint fittings used at MPS3, the joint overlap is about four to one. The smallest overlap occurs in a 3 inch joint, with an overlap length of 3.6 times pipe wall thickness.

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[4] Crocker and King, *Piping Handbook*, 5th Edition, McGraw-Hill Book Company, page 7-212

3.0 BRAZED JOINT FUNCTIONAL CHARACTERISTICS:

Since the piping loads causing longitudinal stress in the pipe are all transferred by shear stress through the brazed bond, the shear stress in the brazed bond is directly related to longitudinal pipe stress divided by a factor equal to the overlap ratio. Thus for a fully bonded brazed joint, the shear stress is about one fourth of the piping longitudinal stress. If the bond is only 50 percent of maximum then the bond shear stress will be about half the piping longitudinal stress. Given that piping and brazing filler metals have similar strength, a brazed joint has more than enough residual strength to tolerate moderate bond imperfections. Consequently, the joint is not the weak link in the piping assembly.

Consistent with this inherent over-design of brazed joints, the Construction Codes, such as Section III of the ASME Code and ANSI B31.1, require only visual inspection of the resulting bond. ND-5360, Visual Acceptance Standards for Brazed Joints, states "Brazing metal shall give evidence of having flowed uniformly through a joint by the appearance of an uninterrupted, narrow, visible line of brazing alloy at the joint." Surface exams such as by liquid penetrant are not required. Volumetric exams are not specified or even defined for brazed joints.

If the lack of bond is severe then the brazed joint becomes the weak link in the piping assembly. It fails by shear failure of the brazed bond. Brazing with a lower level of bond may however still be acceptable if the piping design basis loads are low enough. A brazing material defect with weepage is not the result of a flaw in the pipe or fitting pressure boundary. The pressure-retaining boundary retains its structural integrity. Although the shear load transfer between the pipe and fitting is clearly a pressure boundary function, the brazing material functions more as a sealant between the connected components and less like a pressure boundary.

With regard to structural integrity, imperfections in the sealant function of the braze material are permissible, provided its load transfer function retains adequate margin. Thus, because there is no direct degradation of the pressure boundary, the available flaw evaluation methodologies such as in ASME Code Case N-513-2 or Generic Letter 90-05, are not directly applicable. In addition, the characterization of braze imperfections is very different from the planar flaws or loss of wall thickness that are addressed in ASME Code, Section III, IWA-3000.

EXAMPLE STRUCTURAL ASSESSMENT

DOMINION
MILLSTONE POWER STATION UNIT 3

Braze Bond Structural Assessment Joint 1A (example only)

Part 1 Basic Data (dashed boxes are inputs)

	Inputs:		Inputs:
Line No:	3SWP-002-999-3	*Pipe Dia*	2.375 in
Sys Function:	A supply to XXX-1A	*Nom. Wall Thk*	0.156 in
Piping Iso:	CP-0123456	*Pipe Mat'l*	SB 466 CDA 706
Joint:	1A	*Fitting Mat'l*	SB 61or 62
Side of Joint:	Upstream	Ref. Bond Strength:	5,000 psi
Jt. Orientation:	Mark 1 is up	Bond Adjustment	10%

Measured Ave. Bond 55% (calculated. For bond measurements, see sheet 'UT Readings')

55 % >= 60 % ? No, Detailed assessment required

Part 2 Bond Data Summary

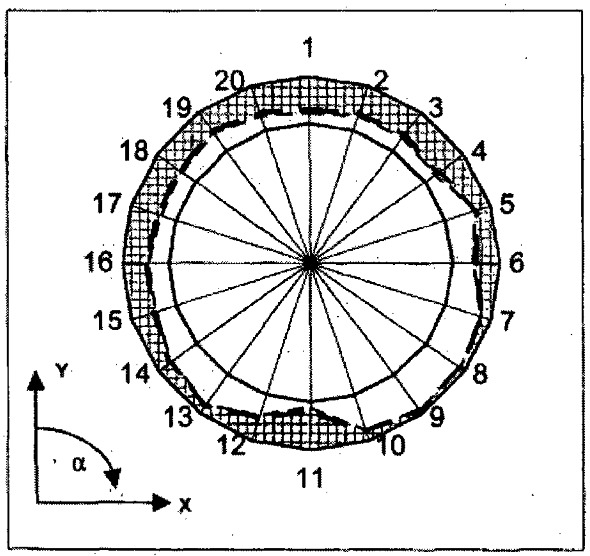
Offsets based on adjusted bond:

Dxx	**0.098** in	
Dyy	**-0.205** in	
Doffset	**0.227** in	19% of pipe radius
Alpha	**12.0** degrees - rotation angle of principal axes	

Calculated effective bond data are in principal axes system, and are based on adusted bond.

	Actual	Adjusted
Bxx	**58%**	**54%**
Byy	**49%**	**43%**
Bbend	**49%**	**43%**
Bpress	**55%**	**50%**

Note: Plot is figurative only, actual braze bond is cylindrical, not through-wall.



Braze Bond Structural Assessment Joint 1A

Part 3 Calculated Bond Load Capability

D	2.375	in
tnom	0.156	in
Pipe Z	0.566	in^3
Linsert	0.656	in
Smax(100%)	25,662	psi

Lookup Tbl: L.insert per MilSpec		
D.nom	D.od	Linsert
3/4	1.05	11/32
1	1.315	7/16
1.5	1.9	5/8
2	2.375	21/32
2.5	2.875	25/32
3	3.5	53/64

Load Capability (Allowable Nominal Pipe Stress)
(Based on bond levels from Part 2)

	Actual	Adjusted	
Sxx	14,997	13,746	psi
Syy	12,538	10,975	psi
Sallow	12,538	**10,975**	**psi**

stress based on shear allow. and percent bond

$$S_{max}(b_{adj}) = b_{adj} \cdot \left(\frac{\pi D^2 \cdot L_{insert}}{4 \cdot Z_{pipe}} \right) \cdot \tau_{max}$$

Part 4 Pipe Stress Data

Stress Calc	NP-X1901
Rev / CCN	Rev. 5 CCN 4
Line No:	3SWP-002-999-3
Sys Function:	A supply to XXX-1A
Piping Iso:	CP-0123456
Joint:	1A

Pipe Dia	2.375	in
Nom. Wall Thk	0.156	in
Pipe Mat'l	SB 466 CDA 706	
Fitting Mat'l	SB 61or 62	
A.pressure	1.865	in^2
Z.pipe	0.566	in^2

inputs:

Stress Node	101
Alt. Stress Node	n/a
SIF Used	2.1
Eff. Pri. SIF	1.575

$$S_{p\_offset} = D_{offset} \cdot \frac{P_{max} A_{press}}{Z_{pipe}}$$

$$S' = \frac{S - S_{lp}}{psif} + S_{p\_offset} + S_{lp} \cdot \frac{B_{bend}}{B_{press}}$$

inputs:

Design Pressure	100	psig
Max Op. Pressure	100	psig
Slp	761	psi
Eq. 8 (P+DL)	2500	psi
Eq. 9 (N/U)	4500	psi
Eq. 9F (Design Basis0	6500	psi

Calculated Nominal Stresses

Sp_offset	75	psi
Sust'd 8'	1830	psi
N/U 9'	3100	psi
Faulted 9F'	4370	psi
Max Nominal	**4370**	psi

Part 5 Structural Integrity Determination Joint 1A

Joint Load Capability	10,975	psi	(from Part 3)
Design Basis Load	4,370	psi	(from Part 4)

Check: **4,370 < 10,975 ===> Braze is adequate for design basis loads**
Monitor until repair/replacement

Braze Bond Measurements Joint 1A

							R	Rmin
	Bond Adjustment		10%				1	0.75
Reading	Angle	Meas. Bond	Adj Bond	PlotValue	Adj Plot		Max	Min
1	0	30%	22%	0.825	0.806		1	0.75
2	18	40%	33%	0.850	0.833		1	0.75
3	36	40%	33%	0.850	0.833		1	0.75
4	54	35%	28%	0.838	0.819		1	0.75
5	72	70%	67%	0.925	0.917		1	0.75
6	90	50%	44%	0.875	0.861		1	0.75
7	108	80%	78%	0.950	0.944		1	0.75
8	126	90%	89%	0.975	0.972		1	0.75
9	144	90%	89%	0.975	0.972		1	0.75
10	162	80%	78%	0.950	0.944		1	0.75
11	180	20%	11%	0.800	0.778		1	0.75
12	198	50%	44%	0.875	0.861		1	0.75
13	216	80%	78%	0.950	0.944		1	0.75
14	234	70%	67%	0.925	0.917		1	0.75
15	252	50%	44%	0.875	0.861		1	0.75
16	270	50%	44%	0.875	0.861		1	0.75
17	288	40%	33%	0.850	0.833		1	0.75
18	306	45%	39%	0.863	0.847		1	0.75
19	324	50%	44%	0.875	0.861		1	0.75
20	342	40%	33%	0.850	0.833		1	0.75

Nreadings	20	Ave	55%	50%
dTheta	18	Min	20%	11%
degrees		Max	90%	89%

Braze Bond Calculations   Joint 1A

Boffset	Nreadings
10%	20

D
2.375
Aoffset
Input
0 degrees
0.000 rad

Equivalent bond based on measured bond readings, without adjustment

Angle	Meas. Bond	cos(theta)	db*cos	db*cos^2	db*sin*cos	sin(theta)	db*sin	db*sin^2
0	30%	1.000	0.300	0.300	0.000	0.000	0.000	0.000
18	40%	0.951	0.380	0.362	0.118	0.309	0.124	0.038
36	40%	0.809	0.324	0.262	0.190	0.588	0.235	0.138
54	35%	0.588	0.206	0.121	0.166	0.809	0.283	0.229
72	70%	0.309	0.216	0.067	0.206	0.951	0.666	0.633
90	50%	0.000	0.000	0.000	0.000	1.000	0.500	0.500
108	80%	-0.309	-0.247	0.076	-0.235	0.951	0.761	0.724
126	90%	-0.588	-0.529	0.311	-0.428	0.809	0.728	0.589
144	90%	-0.809	-0.728	0.589	-0.428	0.588	0.529	0.311
162	80%	-0.951	-0.761	0.724	-0.235	0.309	0.247	0.076
180	20%	-1.000	-0.200	0.200	0.000	0.000	0.000	0.000
198	50%	-0.951	-0.476	0.452	0.147	-0.309	-0.155	0.048
216	80%	-0.809	-0.647	0.524	0.380	-0.588	-0.470	0.276
234	70%	-0.588	-0.411	0.242	0.333	-0.809	-0.566	0.458
252	50%	-0.309	-0.155	0.048	0.147	-0.951	-0.476	0.452
270	50%	0.000	0.000	0.000	0.000	-1.000	-0.500	0.500
288	40%	0.309	0.124	0.038	-0.118	-0.951	-0.380	0.362
306	45%	0.588	0.265	0.155	-0.214	-0.809	-0.364	0.295
324	50%	0.809	0.405	0.327	-0.238	-0.588	-0.294	0.173
342	40%	0.951	0.380	0.362	-0.118	-0.309	-0.124	0.038
		0.000	-0.076	5.160	-0.326	0.000	0.037	5.840
	Bpress	check=0	ry	Bpyy	Bpxy	check=0	rx	Bpxx
	55%		-0.141	0.258	-0.016	0.550	0.068	0.292
		Roffset	Yoffset	Byy	Bxy	Byy+Bxx	Xoffset	Bxx
		0.186	-0.168	0.247	-0.011	0.536	0.080	0.290
			BByy	49%	Bave	54%	BBxx	58%
			Byy_p	0.244			Bxx_p	0.292
				49%				58%

Byy-Bxx=0	Bxy=0	tan 2alpha	cos 2alpha	sin 2alpha	tan check	alpha	
-0.043	-0.011	0.519	0.888	0.461	0.519	0.239	rad
FALSE	FALSE					13.7	deg

$$b_{adj} = \frac{b - b_{offset}}{1 - b_{offset}}$$

Equivalent bond based on adjusted bond readings

Angle	Adj. Bond	cos(theta)	db*cos	db*cos^2	db*sin*cos	sin(theta)	db*sin	db*sin^2
0	22%	1.000	0.222	0.222	0.000	0.000	0.000	0.000
18	33%	0.951	0.317	0.302	0.098	0.309	0.103	0.032
36	33%	0.809	0.270	0.218	0.159	0.588	0.196	0.115
54	28%	0.588	0.163	0.096	0.132	0.809	0.225	0.182
72	67%	0.309	0.206	0.064	0.196	0.951	0.634	0.603
90	44%	0.000	0.000	0.000	0.000	1.000	0.444	0.444
108	78%	-0.309	-0.240	0.074	-0.229	0.951	0.740	0.704
126	89%	-0.588	-0.522	0.307	-0.423	0.809	0.719	0.582
144	89%	-0.809	-0.719	0.582	-0.423	0.588	0.522	0.307
162	78%	-0.951	-0.740	0.704	-0.229	0.309	0.240	0.074
180	11%	-1.000	-0.111	0.111	0.000	0.000	0.000	0.000
198	44%	-0.951	-0.423	0.402	0.131	-0.309	-0.137	0.042
216	78%	-0.809	-0.629	0.509	0.370	-0.588	-0.457	0.269
234	67%	-0.588	-0.392	0.230	0.317	-0.809	-0.539	0.436
252	44%	-0.309	-0.137	0.042	0.131	-0.951	-0.423	0.402
270	44%	0.000	0.000	0.000	0.000	-1.000	-0.444	0.444
288	33%	0.309	0.103	0.032	-0.098	-0.951	-0.317	0.302
306	39%	0.588	0.229	0.134	-0.185	-0.809	-0.316	0.265
324	44%	0.809	0.360	0.291	-0.211	-0.588	-0.261	0.154
342	33%	0.951	0.317	0.302	-0.098	-0.309	-0.103	0.032
		0.000	-0.086	4.622	-0.362	0.000	0.041	5.378
	Bpress	check=0	ry	Bpyy	Bpxy	check=0	rx	Bpxx
	50%		-0.173	0.231	-0.018	0.500	0.083	0.269
		Roffset	Yoffset	Byy	Bxy	Byy+Bxx	Xoffset	Bxx
		0.227	-0.205	0.216	-0.011	0.482	0.098	0.265
			BByy	43%	Bave	48%	BBxx	53%
			Byy_p	0.214			Bxx_p	0.268
				43%				54%

Byy-Bxx=0	Bxy=0	tan 2alpha	cos 2alpha	sin 2alpha	tan check	alpha	
-0.049	-0.011	0.445	0.914	0.408	0.445	0.209	rad
FALSE	FALSE					12.0	deg

$$B'_{yy} = \frac{1}{N}\cdot\sum b_i\cdot\cos(\theta_i)^2$$

$$B'_{xx} = \frac{1}{N}\cdot\sum b_i\cdot\sin(\theta_i)^2$$

$$B'_{xy} = \frac{1}{N}\cdot\sum b_i\cdot\sin(\theta_i)\cdot\cos(\theta_i)$$

$$B_{yy} = B'_{yy} - r_{yy}^2\cdot b_{av}$$

$$B_{xx} = B'_{xx} - r_{xx}^2\cdot b_{av}$$

$$B_{xy} = B'_{yy} - r_{xx} r_{yy}\cdot b_{av}$$

$$\tan(2\cdot\alpha) = \frac{2\cdot B_{xy}}{(B_{yy} - B_{xx})}$$

$$\cos(2\cdot\alpha) = \frac{|B_{yy} - B_{xx}|}{\sqrt{(B_{yy} - B_{xx})^2 + 4\cdot B_{xy}^2}}$$

$$\sin(2\cdot\alpha) = \frac{\mathrm{sgn}(\tan(2\cdot\alpha))\cdot|2\cdot B_{xy}|}{\sqrt{(B_{yy} - B_{xx})^2 + 4\cdot B_{xy}^2}}$$

$$\alpha = \frac{1}{2}\,\mathrm{asin}(\sin(2\cdot\alpha))$$

$$B_{p\_yy} = \frac{B_{yy} + B_x}{2} + \frac{B_{yy} - B_x}{2}\cdot\cos(2\alpha) + B_{xy}\sin(2\alpha)$$

$$B_{p\_xx} = \frac{B_{yy} + B_x}{2} - \frac{B_{yy} - B_x}{2}\cdot\cos(2\alpha) - B_{xy}\sin(2\alpha)$$

$$B_{p\_xy} = B_{xy}\cos(2\alpha) - \frac{B_{yy} - B_x}{2}\cdot\sin(2\alpha)$$

Measured Bonds

Bond values calculated at A_offset angle			
Yoffset	Byy	Xoffset	Bxx
-0.168	49%	0.080	58%

Adjusted Bonds

Bond values calculated at A_offset angle			
Yoffset	Byy	Xoffset	Bxx
-0.205	43%	0.098	53%

MECHANICAL TESTS

DOMINION
MILLSTONE POWER STATION UNIT 3

MECHANICAL TESTS

1.0 BACKGROUND:

The correlation developed by the testing conservatively determines a required bond level for a given intensity of joint loading. The results of these tests support the use of the comparison shown in Figure 2, Attachment A, for the structural integrity analysis.

2.0 TEST SAMPLE DESIGNS

The effort to empirically confirm required bond levels for varying intensities of joint loadings consisted of three separate series of mechanical tests:

a) specially fabricated joints with a controlled average bond level,
b) specially fabricated joints that had disbandment on a contiguous arc-segment of the joint, and
c) field sample piping joints, salvaged from piping removed from the plant.

All joints were tested in three-point bending with the brazed fitting in the middle of the configuration.

2.1 Specially Fabricated Joints With a Controlled Average Bond Level:

By a combination of machining and use of insert-groove type fittings, a series of test joints were fabricated with equivalent bond levels of 12. 30. 40 and 60 percent. The machining removed only about 30 mils of pipe thickness so that piping strength was not significantly affected. The samples were fabricated for 2-inch and for 3-inch joints. Three examples of each size and bond level were fabricated, for a total of 24 samples. (Of the 24 samples in this category, one of the 40 percent bond samples was subsequently found to have less than the fully intended bond and is excluded from the results.)

2.2 Specially Fabricated Joints That had Disbondment on a Contiguous Arc-Segment of the Joint:

These test items were intended to explore the effect of having a significantly non-uniform distribution of bond area around the circumference of the joint. Six samples were fabricated with disbandment segment angles of 36, 48, 72.90, 108 and 126 degrees. The average bond levels for these, assuming perfect bond except in the disbonded area, ranged from 90 percent down to 65 percent, respectively.

2.3 Field Sample Piping Joints:

These joints were salvaged from piping that were removed from the plant after about 20 years of service, and screened by Ultrasonic Testing (UT). Piping joints with the lowest of measured bond were selected for testing.

The nine items selected for testing included the following:

Description	Quantity
2 inch couplings	3
3 inch couplings	2
3 inch tee (run sides)	1
3 inch flanges	3

The couplings and the tee included two brazed joints subjected to test loads. The test flanges were mated to full strength flanges not under test.

3.0 MECHANICAL TEST RESULTS

The results from testing on each of the series of tests are described in the balance of this section. The referenced figures are included in Attachment A. A test report has been incorporated into the Millstone Station plant records.

3.1 Specially Fabricated Joints With a Controlled Average Bond Level:

For the intentionally disbanded joints, all joints with 30 percent or better true bond achieved full piping collapse strength with no failure of the bond. Refer to Figure 3. As testing of each joint continued above the piping collapse load, one of the 40 percent true bond joints had indications of bond failure. The 12 percent true bond joints all experienced bond failure before reaching piping collapse load, but still withstood a minimum of 37 percent of the piping collapse load. Refer to Figure 4. All test items achieved their test collapse load at a load well above that which would be predicted for a 5 ksi braze shear strength.

3.2 Specially Fabricated Joints that had Disbondment on a Contiguous Arc-Segment of the Joint:

From 36 through 72 degrees of segment disbondment, the test items all achieved full piping collapse load. The test items from 90 through 126 degrees disbondment exhibited progressively lower collapse load, as shown in Figure 4. At 126 degrees disbondment, the test item achieved about 60 percent of the piping collapse load. The load deflection curves for these joints did not exhibit any indications of bond failure, however at the extremes of deflection (well above the level that would be acceptable for application of this methodology) the higher angle joints were significantly distorted. For such large levels of deflection it was apparent that the close mechanical fit-up of the pipe in socket configuration contributed to joint bending strength. All test items achieved their test collapse load at a load well above that which would be predicted for a 5 ksi braze shear strength.

3.3 Field Sample Piping Joints:

The field sample test items exhibited considerable variation in collapse load for roughly similar UT bond readings. The variations were expected for the field samples. Figures 6 and 7 show the displacement load curve for the tested field samples. Bond failure limited the collapse load in the two-inch Joints 37 and 39, and the three-inch Joints 3 and 9. The load curve for Joint 9 has a slight discontinuity at 11.9 ksi that is conservatively considered to indicate initial bond failure, even though the load continues above this point. The collapse load for other samples was limited by the piping collapse load, which is equivalent to about 21 ksi. Even with the low UT bond readings the field samples developed at least 50 percent of the piping collapse load. The higher than expected collapse load for some of the three-inch joints is believed to be partly due to the thickness of filler metal present as a fillet at the face of some of the joints. All test items achieved their test collapse load at a load well above that which would be predicted for a 5 ksi braze shear strength and the adjusted percent bond used in this methodology.

The adequacy of the 5 ksi shear stress assumed in the methodology in Equation 3 of Figure 2, Attachment A, for estimating joint strength is confirmed by the testing margins shown in the following table.

Table 1: Test Load vs. Bond Shear Capacity

Test Joint	Average UT %	Adjusted UT %	Test Collapse Load, ksi	Shear Capacity Load, ksi	Test / Shear Margin
36	65	61	22.8	15.8	1.44*
37	27	19	11.6	4.9	2.41
39	55	50	19.6	13.0	1.52
2	45	39	27.3	9.0	3.02*
3	47	41	22.6	9.6	2.38*
4A	15	5	27.3	1.3	23.59*
9	38	31	11.9	7.2	1.69
9J	48	42	28.6	9.8	2.95*
31A	21	12	32.0	2.8	11.61*

* Piping collapse load reached before bond failure or deflection run out.

The data in Table 1 are plotted in Figure 9, Attachment A. Of the joints that were limited by bond failure prior to reaching piping collapse load, the minimum margin factor was 1.52. This minimum margin appears in Joint 39, with a 50 percent adjusted average bond. Review of detailed bond readings around the circumference of Joint 39 gives an equivalent adjusted bond of 43 percent for the bending axis used during the test, corresponding to a margin factor of 1.74 for this test case.

ULTRASONIC TEST PROCEDURE

Provided For Reference Only
(subject to change)

DOMINION
MILLSTONE POWER STATION UNIT 3

Non Destructive Examination Procedure

Millstone Station

ULTRASONIC EXAMINATION PROCEDURE FOR EXAMINATION OF BRAZED JOINTS - MILLSTONE UNIT 3 SERVICE WATER PIPING

MP-UT-45

Rev. 000-01

Approval Date: 07/24/07

Effective Date: 07/31/07

Ultrasonic Examination Procedure for Examination Of Brazed Joints – Millstone Unit 3

TABLE OF CONTENTS

1. PURPOSE

1.1 Objective

This procedure describes equipment and procedures that shall be used in the ultrasonic inspection of brazed pipe joints.

1.2 Applicability

1.2.1 This procedure contains all the specific application requirements for the examination of Millstone Unit 3 service water system brazed joints to determine percentage of bonded areas.

1.3 Discussion

1.3.1 In ultrasonic examination of brazed pipe joints, ultrasonic waves are transmitted from a search unit into the brazed joint to determine the amount of braze bond present beneath the search unit.

1.3.2 Brazed joints shall be examined by the straight-beam (compressional wave) method as illustrated in Figure 1. Signals, if present along the base line, occur successively (reading from left to right) from the following sources; the insert groove (if present), the fitting inside diameter, the pipe inside diameter and possible multiple reflections.

1.3.3 To examine a brazed joint, the transducer is placed over the bonded area of the joint and moved around the circumference in increments and in a number of passes determined by the number of lands, land or engagement area width and the crystal size. The percent of bond and pattern are determined for each increment, land or pass and the total joint.

2. PREREQUISITES

2.1 General

2.1.1 The outer surface of the fitting socket shall be prepared sufficiently to obtain satisfactory sound transmission and shall not be rounded in the longitudinal direction and should be relatively parallel to the pipe surface.

2.1.2 For joint configurations that cannot be satisfactorily ultrasonically examined, this procedure is not applicable.

2.2 Personnel Requirements

2.2.1 Only Level II, or Level III personnel may independently perform, interpret, evaluate and report examination results.

2.2.2 Levels II and III shall be certified in accordance with Reference 6.1.

2.2.3 The UT examiners shall have sufficient knowledge and training to determine ultrasonically the bond in brazed joints.

2.2.4 UT examiners shall demonstrate ability to recognize such technical deficiencies as insufficient beam penetration (transmission), poor transducer contact and interfering contact surface roughness from patterns displayed on the ultrasonic screen.

2.2.5 UT examiners shall maintain proficiency for examination of brazed joints by performing an examination of a brazed joint at least every six months.

2.2.6 Examiners who do not meet the requirement of 2.2.5 above shall demonstrate their ability to examine brazed joints prior to performing examinations in the field. See Table 1 for initial examiner qualification and proficiency requirements.

2.3 **Measuring and Test Equipment**

2.3.1 All measuring and test equipment shall meet the requirements of WC-8.

2.4 **Examination Limitations**

2.4.1 Examiners shall identify potential examination coverage limitations prior to performing the examination.

3. DEFINITIONS

3.1 Face of Fitting - The annulus surrounding the socket end.

3.2 Insert Groove - The groove in the fitting socket prepared to contain the brazing alloy ring.

3.3 Land, Fitting - That portion of the fitting on the side of the insert groove nearest the middle of the fitting.

3.4 Land, Center - That portion of the fitting between the grooves in a multiple insert fitting.

3.5 Land, Pipe - That portion of fitting on the side of the insert groove toward the end of the fitting.

3.6 Examiner – A person that has sufficient knowledge in determining bond.

3.7 Level III Examiner – The person in charge of ensuring examiners are qualified and have sufficient knowledge in determining bond.

4. INSTRUCTIONS

4.1 **Examination Preparation**

4.1.1 After preparing the surface of the fitting, lay out the circumference as follows:

a) Marking shall be accomplished using a permanent marker on the fitting surface, in increments not exceeding one inch. If the joint is to be re-examined, vibro-etching may be advisable but is not mandatory

b) Markings shall be numbered clockwise as viewed facing the fitting from the pipe.

4.2 **Examination Method**

4.2.1 The straight beam longitudinal wave method shall be used.

4.2.2 The position of reflections along the base line of the viewing screen shall be indexed for signals from an insert groove, the inside diameter of the fitting, and the inside diameter of the pipe.

4.2.3 For fittings containing insert grooves, place the transducer so that the active area is over one land only. Mark the first back reflection of the insert groove, inside diameter of fitting (no bond) and the inside diameter of the pipe (bond) at the left edge of the signal, on the face of the viewing screen. If necessary, check the back reflections with the reference calibration standard to ensure positive signal identification.

4.2.4 The amplitude of any one signal shall not reach a saturation point on viewing screen presentation.

4.2.5 For fittings which contain no insert grooves, place the transducer so that the active area: covers 1/2 of the OD of the fitting in the engagement area.

4.2.6 Reflection markings and scope presentations will be as above except there will be no ring groove signal.

4.2.7 The *continuous* or static scan technique shall be used.

4.2.8 In the continuous scan, the transducer is moved in a continuous movement from one increment mark to the next increment mark. The bond and no-bond signals are mentally averaged while scanning the increment. The bond for the increment is estimated to the nearest five percent in accordance with 4.2.9 through 4.2.11.

4.2.9 In the static scan, the transducer is placed on the increment mark. The bond and no-bond signals are recorded for the increment. The bond for the increment is estimated to the nearest five percent in accordance with 4.2.9 through 4.2.11.

4.2.10 Readings for joints with inside pipe diameters less than 1-1/2 inches shall be taken at four equally spaced intervals in the increment, and for joints with inside pipe diameters greater than 1-1/2 inches, the readings shall be taken at three equally spaced intervals in the increment.

4.2.11 These increments shall be measured on the outside diameter of the fitting.

4.2.12 Bond indications shall be recognized as to the percentage of bond without actually referring to the formula:

$$\% \text{ bond} = \frac{100 \text{ (bond amplitude}}{\text{(bond amplitude plus no-bond amplitude)}}$$

4.2.13 Increments for which no ultrasonic reading can be obtained shall be marked as follows:

a) "X" - Increments which are inaccessible due to fitting configuration.

b) "NA" - Increments which are inaccessible due to piping, configuration or location.

c) "NP" - Increments in which there is a lack of ultrasonic penetration.

d) Increments of the above type shall be assigned percent bond values as follows:

"NA" = 0% bond

"NP" and "X" = Increments up to a total length not exceeding 20 percent of the circumference of the land shall be assigned a percentage bond value equal to that of the lowest readable increment adjacent to the "X" or "NP" increments or 60 percent whichever is the least.

"X" or "NP" increments in excess of 20 percent of the circumference shall be assigned a bond value of 0 percent.

The examiner may, at his discretion, shift the incremental scale so that the minimum number of increments contain "X", "NP" or "NA" values.

NOTE: *Within the 20 percent limitation, two or more adjoining "X" and/or "NP" increments are* considered a group of increments if the average of the remaining increments is 60 percent or more. The outermost two of any group within the 20 percent maximum limitation shall be rated on the basis of the adjacent readable increment. The inner increments of the group shall be assigned a zero value for calculation purposes.

4.2.14 The bond for the land (or pass of a no insert fitting) is the average of the readings for all increments in the land.

4.2.15 The percentage bond for the joint is that percentage of the total design faying surface which is bonded.

4.3 **Required Documentation**

4.3.1 The UT calibration data shall be documented on Attachment 1.

4.3.2 A sketch for each component detailing the increment locations shall be documented on Attachment 2.

5. REVIEW AND SIGN-OFF

The intent of this section is to clarify who is responsible to sign off on the examination data sheet.

5.1 The Examiner shall print name, sign, and date the data sheet. The examiner shall then submit the completed data sheet to the appropriate reviewer.

5.2 Reviewer's sign-off box can be signed only by Dominion Level II or III personnel (or their designee's) certified in the ultrasonic method.

5.2.1 Review of the data sheet is intended to provide reasonable assurance of accuracy, thoroughness and procedure compliance.

5.2.2 The reviewer should compare the examiners data sheet against the AWO and other known parameters of the component(s) being examined.

5.2.3 Review of the examination data sheet shall take place as soon as possible, and prior to the close-out of the AWO. The examination data sheet shall then be forwarded to the appropriate AWO package and/or job supervisor.

6. REFERENCES

6.1 ANSI/ASNT CP-189, 1991 Edition

6.2 WC-8, "Control and Calibration of Measuring and Test Equipment"

6.3 Granted Relief Request IR-2-38, "Structural Integrity Assessment Methodology for Brazed Joints (TAC NO. MC8893) - Millstone Power Station, Unit No. 3

7. SUMMARY OF CHANGES

7.1 Revision 000-01

7.1.1 Deleted paragraph 1.2.1 which stated that procedure was for Engineering use only until NRC acceptance of relief request.

7.1.2 Added paragraphs 2.2.5 and 2.2.6 to address proficiency of examiners.

7.1.3 Added Table 1 which establishes frequency, number of samples required, and acceptance criteria for initial qualification, maintenance of proficiency, and requalification.

Table 1

Brazed Joint Examiner Qualification

Qualification Type	No. of Samples	Period of Qualification
Initial Qualification	6	3 Years
Proficiency	3	6 months
Requalification	6	3 Years

Acceptance Criteria:

Initial Qualification:

The percent bond of the six test specimens as reported by the examinee shall be compared to the true bond and accepted on the following basis; the arithmetic average of the six test specimens shall not deviate by more than 8% from the true bond and no single specimen shall deviate by more than 15% from the true bond.

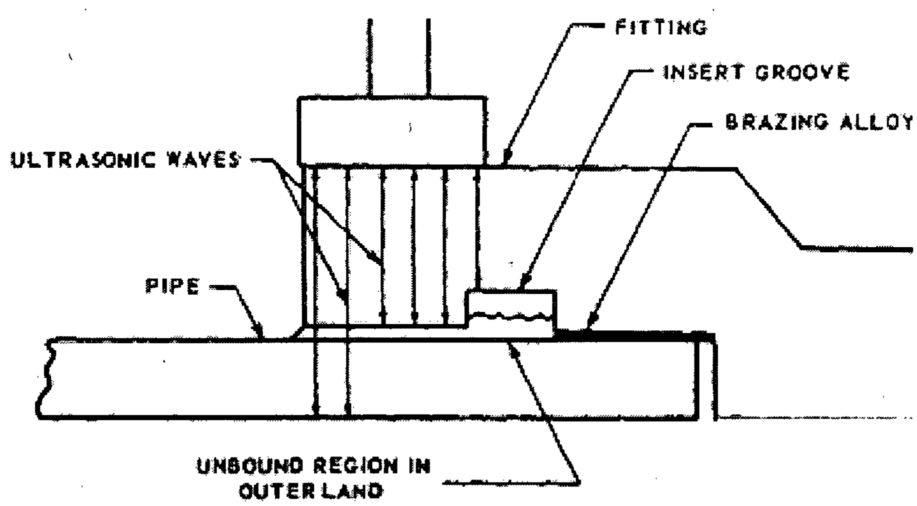
Proficiency Maintenance:

The percent bond of the three test specimens as reported by the examinee shall be compared to the true bond and accepted on the following basis; the arithmetic average of the three test specimens shall not deviate by more than 15% from the true bond.

Requalification:

Same as initial qualification.

Figure 1


FITTING
INSERT GROOVE
BRAZING ALLOY
ULTRASONIC WAVES
PIPE
UNBOUND REGION IN
OUTER LAND

ATTACHMENT 1
ULTRASONIC CALIBRATION DATA SHEET

Plant: ______________________ Unit: ________________

Purpose: ____

Cal Block Number __________________________________

DWG No. ____

Page _______ of ______

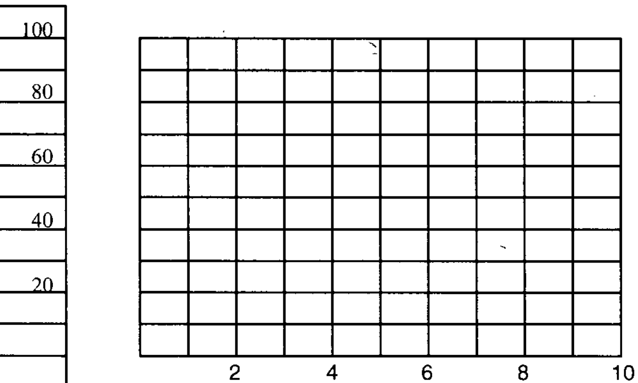
AWO Number: ________________________________

Cal Block Temp _____________________________

Thermometer S/N & Due Date _____________________

Search Unit	
Manufacturer	
Style or Type	
Frequency	
Size & Shape	
Mode T or C	
Search Unit Angle	
Measured Angle	
Serial Number	
Cable Type, Length	
No. of Connectors	

Instrument & Settings	
Mfg. / Model	
Serial Number	
Range	
Material Velocity	
Delay	
Pulser	
Reject	
Frequency	
Damping	
Zero Value	
Pulse Rep Rate	
Gain Setting	



Attachments (Check)	
Sketch Sheet	
Supplements	

Calibrations	Time
Initial Calibration	
Final Calibration	
Final Calibration	

CRT Setup	Inches
Metal Path	
Depth	

Couplant Data	
Brand	
Batch Number	
SAP Batch Mgmt. No.	

Component ID	Component Type	Comments

Examiner (Print & Sign) ______________________________ Level ________ Date ________
Examiner (Print & Sign) ______________________________ Level ________ Date ________
Reviewer (Signature) ________________________________ Level ________ Date ________

Attachment 2

Millstone Power Station	BRAZED JOINT SKETCH SHEET PAGE OF

Examined by (print/sign) ______________________________ Level _____ Date __________

Millstone Power Station Reviewer (sign) ______________________________ Level _____ Date __________

10 CFR 50.55a Request Number IR-3-05

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1. ASME Code Components Affected

ASME Code Class:	Code Class 1
References:	WCAP 14572, Revision 1-NP-A, Second Interval Relief Requests IR-2-39 and IR-2-47
Examination Category:	R-A
Item Numbers:	R1.11 (Safe End-to-Pipe Welds) R1.15 (Nozzle-to-Safe End Welds)
Description:	Examination of Weld Overlays
Components:	Dissimilar Metal Piping Welds with Alloy 82/182 Weld Metal and Adjacent Welds which have had a Full Structural Weld Overlay Applied. See Below for List of Welds.

1. Weld No. 03-X-5551-X-T: Weld overlay encapsulating Pressurizer surge nozzle-to-safe end dissimilar metal weld and the adjacent safe end-to-pipe weld (Weld No. RCS-SL-FW-4).
2. Weld No. 03-X-5641-E-T: Weld overlay encapsulating Pressurizer spray nozzle-to-safe end dissimilar metal weld and the adjacent safe end-to-pipe weld (Weld No. RCS-517-FW-12).
3. Weld No. 03-X-5644-A-T: Weld overlay encapsulating Pressurizer safety nozzle at 81° azimuth-to-safe end dissimilar metal weld and the adjacent safe end-to-pipe weld (Weld No. RCS-516-FW-1)
4. Weld No. 03-X-5648-B-T: Weld overlay encapsulating Pressurizer safety nozzle at 147° azimuth-to-safe end dissimilar metal weld and the adjacent safe end-to-pipe weld (Weld No. RCS-516-FW-3)
5. Weld No. 03-X-5649-C-T: Weld overlay encapsulating Pressurizer safety nozzle at 212° azimuth-to-safe end dissimilar metal weld and the adjacent safe end-to-pipe weld (Weld No. RCS-516-FW-5)
6. Weld No. 03-X-5650-D-T: Weld overlay encapsulating Pressurizer relief nozzle at 278° azimuth-to-safe end dissimilar metal weld and the adjacent safe end-to-pipe weld (Weld No. RCS-513-FW-1)

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

The inservice inspection of the subject welds was initially performed in accordance with ASME Section XI, IWB-2500, Examination Categories B-F and B-J.

An alternative to the ASME Section XI requirements for the inservice inspection of Class 1 piping, Category B-J and B-F welds was implemented during the second interval based on the Risk-Informed technology developed in accordance with the Westinghouse Owners Group Topical Report "WCAP 14572, Revision 1-NP-A". The request to use this alternative was submitted to the Nuclear Regulatory Commission on July 25, 2000 with approval received on March 12, 2002.

During the second interval, full structural weld overlays were applied to the subject welds. Inservice inspection for the weld overlays was performed in accordance with approved relief requests IR-2-39 (for Weld No. 03-X-5641-E-T) and IR-2-47 (for the remainder of the listed weld overlays.

4. Reason for Request

Currently, there is no comprehensive criteria for a licensee to perform inservice examination of weld overlays applied as a repair or for preemptive measures due to susceptibility of the underlying weld to PWSCC.

The applications of the weld overlays at MPS3 were one time Relief Requests in the second interval based on the guidance of Code Case N-504-2 for Relief Request IR-2-39 and Code Case N-740 for Relief Request IR-2-47. For the third interval, the subsequent examination of the weld overlays needs to be considered. DNC proposes to combine the examination criteria for the weld overlays identified in Relief Requests IR-2-39 and IR-2-47 into a one examination criteria as described below.

5. Proposed Alternative and Basis for Use

5.1 Each weld overlay has been examined once during the first or second refueling outage following application of the weld overlay. The weld overlay examinations showed no indication of crack growth or new cracking and will be placed into a unique population within the ISI Program to be examined on a sample basis. Twenty-five percent of this population shall be added to the ISI Program as new welds in accordance with IWB-2412(b).

5.2 The 25% sample shall consist of the same welds in the same sequence during successive intervals to the extent practical (note that all welds experience pressurizer temperatures).

5.2.1 These examinations may be deferred to coincide with the vessel nozzle examinations required by Category B-D.

5.2.2 Examinations during future intervals may be deferred to the end of the interval, provided no additional repair/replacement activities have been performed on the examination item, and no flaws or relevant conditions requiring successive examination in accordance with Attachment 1 are contained in the mitigated weld.

5.3 The examinations shall be volumetric (ultrasonic) and shall meet the applicable requirements of Appendix VIII. The requirements for the examination volume and required thicknesses shall be as described in Attachment 1, Figures 1(a) "Examination Volume in Full Structural Weld Overlays" and 1(b) "Definition of Thickness t_1 and t_2 for Application of IWB-3514 Acceptance Criteria."

5.4 Acceptance Criteria

5.4.1 General

5.4.1.1 The volumetric examinations shall be evaluated by comparing the examination results with the acceptance standards in 5.4.2.

5.4.1.2 Volumetric examination results shall be compared with recorded results of the preservice examination and prior inservice examinations. Acceptance of welds for continued service shall be in accordance with 5.4.2.

5.4.2 Acceptance

5.4.2.1 Acceptance by Volumetric Examination

5.4.2.1.1 A weld whose volumetric examination confirms the absence of flaws shall be acceptable for continued service.

5.4.2.1.2 Flaws shall meet the acceptance standards of IWB-3514 or be accepted for continued service in accordance with 5.4.2.2 or 5.4.2.3.

5.4.2.1.3 A weld with new planar surface flaws or unexpected or unacceptable growth of existing flaws shall be accepted for continued service in accordance with the provisions of 5.4.2.2 or 5.4.2.3.

5.4.2.2 Acceptance by Repair/Replacement Activity

5.4.2.2.1 A weld whose volumetric examination reveals a flaw not acceptable for continued service in accordance with the provisions of 5.4.2.3 is unacceptable for continued service until the additional examinations of 5.4.3 are satisfied and the weld is corrected by repair/replacement activity in accordance with IWA-4000.

5.4.2.2.2 For weld overlay examination volumes (Figure 1(a)) with unacceptable indications in accordance with 5.4.2.3.2, the weld overlay shall be removed, including the original defective weld, and the weld shall be corrected by repair/replacement activity in accordance with IWA-4000.

5.4.2.3 Acceptance by Evaluation

5.4.2.3.1 Previously evaluated flaws that were mitigated by the full structural weld overlay need not be reevaluated nor have additional successive or additional examinations performed unless the previously evaluated flaws have grown or new planar flaws have been identified. The flaw is not considered to have grown if the size difference is within the measurement accuracy of the NDE technique employed.

5.4.2.3.2 A weld overlay whose volumetric examination detects planar flaw growth or new planar flaws that exceed the acceptance standards of IWB-3514 is acceptable for continued service without repair/replacement activity if the weld overlay meets the acceptance criteria of IWB-3600 and the additional examinations of 5.4.3 are performed. If a planar flaw is detected in the outer 25% of the original weld/base metal thickness for the examination volume it is acceptable for continued service if the crack growth calculations and structural design and sizing calculations required for original weld overlay acceptance show or are revised to show acceptability of the detected flaw. Any indication in the weld overlay material characterized as stress corrosion cracking is unacceptable.

5.4.3 Additional Examinations

5.4.3.1 Examinations of additional weld overlays during the current outage are required if unacceptable planar flaws are detected in the weld overlay thickness, or if this examination reveals crack growth into the examination volume larger than predicted by the previous 5.4.2.3 analysis. The number of additional weld examinations shall be equal to the number of overlaid welds originally scheduled to be performed during the present inspection period.

5.4.3.2 If the additional examinations required by 5.4.3.1 reveal unacceptable flaws (5.4.2.3.2), the remaining weld overlays shall be volumetrically examined during the current interval.

6. Duration of Proposed Alternative

This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019.

7. Precedents

This is a first time request and DNC knows of no known examples of licensees applying to use the criteria in N-770 for the inservice inspection of weld overlays at this time. This request is being submitted because of the need to apply consistent examination requirements for weld overlays within the Third Inservice Inspection Interval. The alternative requirements proposed in this request are derived from those in Code Case N-770, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities, Section XI, Division 1." Code Case N-770 has been approved by ASME (ASME C&S Connect Record No. 08-9). Only those requirements pertinent to the inservice inspection of full structural weld overlays were used (Code Case N-770, Table 1, Item F).

8. References

8.1 2004 Edition, No Addenda, ASME Code, Section XI.

8.2 ASME Code Case N-770, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities, Section XI, Division 1" (Approved by ASME January 26, 2009).

8.3 Dominion Request for Relief IR-2-39, Revision 1 "Use of Weld Overlay and Associated Alternative Repair Techniques", dated October 19, 2005, ADAMS Accession No. ML052930108

8.4 NRC Letter, "Millstone Power Station Unit No. 3 – Issuance of Relief from Code Requirements (TAC NO. MC8609)", dated January 20, 2006 , ADAMS Accession No. ML053260012

8.5 Dominion Request for Relief IR-2-47, Revision 1 "Use of Weld Overlay as an Alternative Repair Technique", dated March 28, 2007 , ADAMS Accession No. ML070880565

8.6 NRC Letter, "Request for Approval to Use IR-2-47 for Dissimilar Metal Weld Overlays as an Alternative Repair Technique (TAC NO. MD3379)", dated May 3, 2007 , ADAMS Accession No. ML071210024

Inservice Inspection Requirements For Full Structural Weld Overlay.

(Figures 1(a) and 1(b) are shown on the next page.)

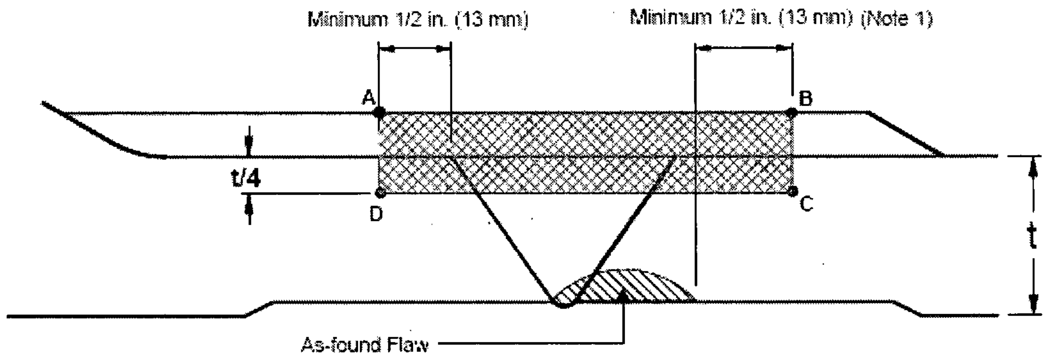
(a) The weld overlay examination volume in Fig. 1(a) shall be ultrasonically examined to determine the acceptability of the weld overlay and to determine if any new or existing cracks have propagated into the outer 25% of the original weld or base material or into the overlay. The angle beam shall be directed perpendicular and parallel to the piping axis, with scanning performed in four directions.

(b) The weld overlay shall meet the inservice examination standards of IWB-3514. In applying the acceptance standards to planar indications, the thickness t_1 or t_2, defined in Fig. 1(b), shall be used as the nominal wall thickness in IWB-3514, provided the base material beneath the flaw (i.e., safe end, nozzle, or piping material) is not susceptible to PWSCC. For susceptible material, t_1 shall be used. If the acceptance standards of IWB-3514 cannot be met, the weld overlay shall meet the acceptance standards of IWB-3600. Any indication characterized as stress corrosion cracking in the weld overlay material is unacceptable.

(c) As an alternative to (a), for inservice inspection, the weld examination volume in ASME Section XI, Figure IWB-2500-8(c) may be ultrasonically examined. If cracking is detected extending beyond the weld examination volume, the weld examination of (a) and (b) above shall be performed to determine the acceptability of the weld overlay.

(d) If inservice examinations of (a), (b), or (c) reveal crack growth, or new cracking in the weld overlay or outer 25% of original weld/base material meeting the acceptance standards, the weld overlay examination volume shall be reexamined during the first or second refueling outage following discovery of the crack growth or new cracking. The weld overlay examination volume shall be subsequently examined two additional times at the period of one or two refueling outages, i.e., a total of 3 examinations within 6 refueling outages.

(e) If the examinations required by (d) reveal that the flaws remain essentially unchanged for three successive examinations, the weld examination schedule may revert to the sample and schedule of examinations identified in 5.1.

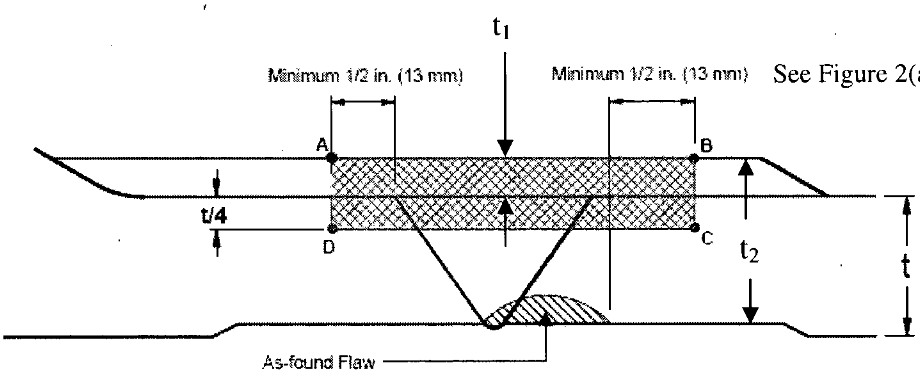


Examination Volume A-B-C-D

GENERAL NOTE: The weld includes the nozzle or safe end butter where applied.

NOTE 1: For axial and circumferential flaws, the axial extent of the examination volume shall extend at least ½ in. (13 mm.) beyond the as-found flaw and at least ½ in. (13 mm.) beyond the toes of the original weld, including weld end butter, where applied, plus any PWSCC-susceptible base material in the nozzle and safe-end.

Fig. 1(a): Examination Volume in Full Structural Weld Overlays



Examination Volume A-B-C-D

GENERAL NOTES:
(a) The nominal wall thickness is t_1 for flaws in the examination volume A-B-C-D and t_2 for flaws outside examination volume A-B-C-D.
(b) For flaws that are in examination volume A-B-C-D and extend outside this examination volume, the thickness t_1 shall be used.
(c) The weld includes the nozzle or safe end butter, where applied, plus any PWSCC-susceptible base material in the nozzle and safe-end.

Fig. 1(b): Definition of Thickness t_1 and t_2 for Application of IWB-3514 Acceptance Standards

10 CFR 50.55a Request Number IR-3-06

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(ii)

--Hardship or Unusual Difficulty
Without Compensating Increase in Level of Quality or Safety--

1. ASME Code Components Affected

ASME Code Class:	Code Class 2
Reference:	ASME Section XI, IWA-5244(b)
Examination Category:	C-H
Item Number:	C7.10
Description:	Class 2 buried segments of piping from the MPS3 Refueling Water Storage Tank (RWST) to the Quench Spray (QSS) and Safety Injection (SI) Systems, and from the Demineralized Water Storage Tank (DWST) to the AFW System
Components:	See Applicable Line Numbers Below

The applicable piping line numbers are identified as follows:

- Line 3SIL-024-152-2 - One 24" (common train) suction line of the low pressure safety injection (SIL) / residual heat removal (RHS) pumps from the RWST that also provides suction to the high pressure safety injection (SIH) and charging (CHS) pumps. (Reference P&ID 25212-26912, Sheet 1)
- Lines 3QSS-014-022-2/3QSS-014-026-2 - Two 14" suction lines for the "A" and "B" train QSS pumps from the RWST. (Reference P&ID 25212-26915)
- Lines 3FWA-008-001-3 / 3FWA-008-007-3 / 3FWA-010-013-3 - Three separate 8" and 10" suction lines for the "A", "B" and swing train AFW pumps from the DWST. (Reference P&ID 25212-26930, Sheet 2)

Excerpts of P&ID drawings are provided in Attachment 1 for information only.

All of the subject buried segments are constructed of corrosion resistant Type 304 stainless steel. During original installation additional preventative measures were taken to mitigate corrosion and protect the external piping surfaces with the application of two coats of a silicone protective coating.

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. **Applicable Code Requirement**

The 2004 Edition of ASME Section XI requires that for "Buried Components" the pressure test requirements of IWA-5244(b) will be applied as follows:

For buried components where a VT-2 visual examination cannot be performed, the examination requirement is satisfied by the following:

(1) The system pressure test for buried components that are isolable by means of valves shall consist of a test that determines the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components. The acceptable rate of pressure loss or flow shall be established by the Owner.

(2) The system pressure test for nonisolable buried components shall consist of a test to confirm that flow during operation is not impaired.

(3) Test personnel need not be qualified for VT-2 visual examination.

4. **Reason for Request**

An alternative is requested from performing the pressure testing using the pressure loss or change in flow methods described in IWA-5244(b)(1) for the buried piping segments of the Class 2 Quench Spray (QSS), Safety Injection (SI) and Auxiliary Feedwater (AFW) Systems. The alternative is requested on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The buried piping segments of the Class 2 QSS, SI, and AFW Systems are provided with a single, normally locked-open valve at their respective storage tanks. These are butterfly type valves for the QSS and SI piping from the Refueling Water Storage Tank (RWST) and gate type valves for the AFW piping segments from the Demineralized Water Storage Tank (DWST). These tanks are of such a large capacity that a small increase in level due to leakage through the tank boundary valve could not be detected. A pressure decay test on these buried piping segments that do not have double isolation valves with a drain test connection to quantify internal valve seat leakage could not differentiate between boundary valve internal seat leakage and external pressure boundary leakage from the buried piping segment. To perform an accurate pressure drop test, extensive maintenance or system modification would be required. For example, the storage tanks would need to be drained and additional valves installed, or the valves would need to be removed from the system and blind flanges installed.

The configuration of the piping segments do not provide for a sufficient straight length of pipe to properly install a flowmeter for accurate flow measurement at the storage tank ends of the buried pipe segments. Therefore, it is not possible to compare a change in flow between the ends of the buried components. There is no annulus provided in which the areas at the ends of the buried components could be visually examined and there is no access to the buried sections without excavation.

5. Proposed Alternative and Basis for Use

5.1 Proposed Alternative

DNC proposes to use, as an alternative to the requirements of IWA-5244(b)(1), a verification of unimpaired flow in accordance with IWA-5244(b)(2) to provide an acceptable level of quality and safety. For each segment of the subject buried pipe, periodic flow testing will be performed in accordance with Inservice Test (IST) Program surveillance procedures. These surveillance procedures require flow to be measured, recorded and compared to established acceptance criteria to provide the assurance that flow is not impaired during operation. During each flow test, the pump draws suction from the storage tank through the associated buried sections of piping.

5.2 Basis for Use

Flow testing of the two QSS pumps is performed quarterly and will use the established minimum flow rate specified in the IST procedures as the acceptance criteria for the pressure testing of the associated 14" QSS buried pipe segments. The flow rate is currently specified as 3,950 gallons per minute (gpm).

Flow testing of the two RHS pumps is performed during each Refuel Outage and will use the established minimum flow rate specified in the IST procedures as the acceptance criteria for the associated single 24" SIL buried pipe segment. The flow rate is currently specified as 4,000 gpm.

Flow testing of the three AFW pumps is performed each refueling outage and will use the established minimum flow rates specified in the IST procedures as the acceptance criteria for the associated 8" and 10" AFW buried pipe segments. The flow rate of the two motor driven pumps will be used as the acceptance criteria for the 8" segments and the flow rate of the turbine driven pump will be used as the acceptance criteria for the 10" segment. These flow rates are currently specified as 490 gpm for each of the two motor driven pumps and 750 gpm for the turbine driven pump.

If during the IST surveillances the minimum flows cannot be achieved, the pump(s) would be declared inoperable and a condition report initiated in accordance with the Millstone Power Station Corrective Action Program with further corrective actions as required to restore the pump(s) and/or system to an operable status.

Additionally, the level in the RWST and DWST are monitored periodically to satisfy Technical Specification requirements. In the case of the DWST, monitoring is performed once every 12 hours and in the case of the RWST, monitoring is performed once every seven days. The RWST and DWST also have a low level alarm in the control room.

The existing tank isolation valves are administratively locked open during all modes of operation, thus the buried sections of piping are continuously exposed to the static head pressure of their respective storage tanks. Tank level losses due to leakage from buried piping would be promptly identified.

5.3 Discussion on Acceptable Level of Quality or Safety or Hardship Without A Compensating Increase in the Level of Quality or Safety

Based on the hardship described above and the use of inservice flow testing to verify that flow through the buried piping is unimpaired, and in conjunction with the periodic storage tank level monitoring, this alternative provides an acceptable level of quality and safety.

The hardship is considered to be without a compensating increase in the level of quality or safety for the following reasons:

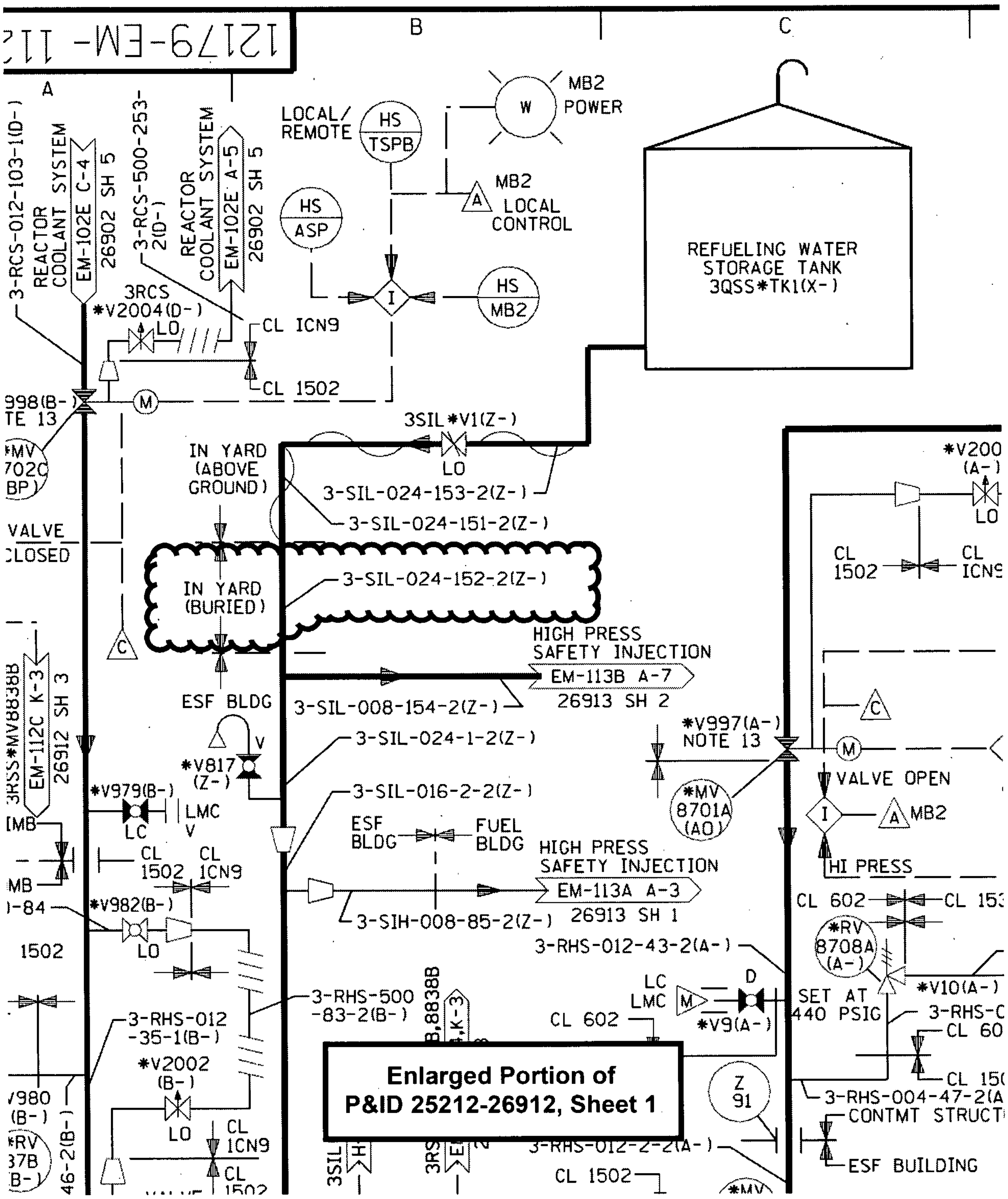
- These surveillance procedures require flow to be measured, recorded and compared to established acceptance criteria to provide the assurance that flow is not impaired during operation.
- During each flow test, the pump draws suction from the storage tank through the associated buried sections of piping.
- The verification of unimpaired flow in accordance with IWA-5244(b)(2) provides an acceptable level of quality and safety considering the proposed alternative and its basis for use.

6. Duration of Proposed Alternative

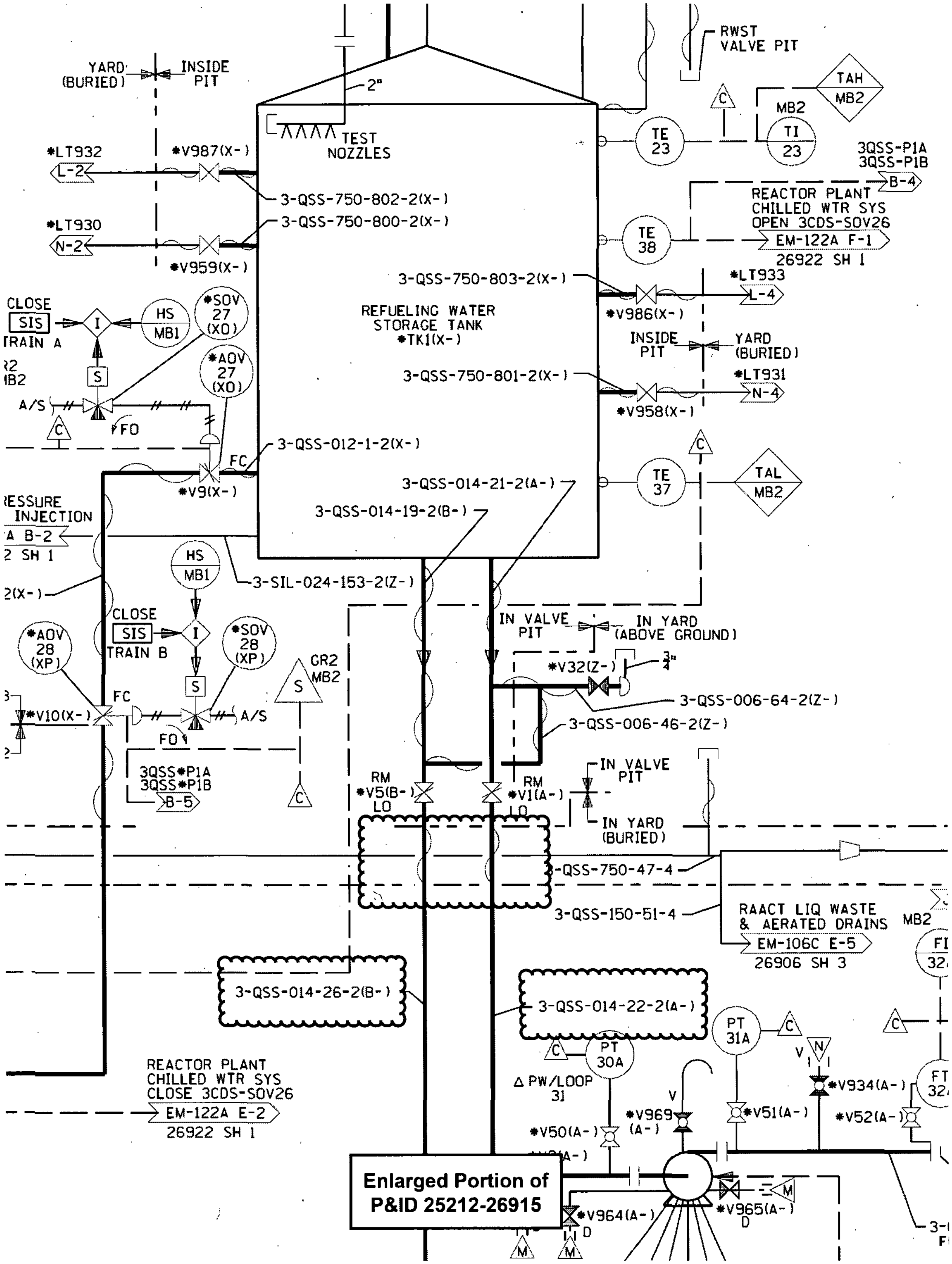
This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019.

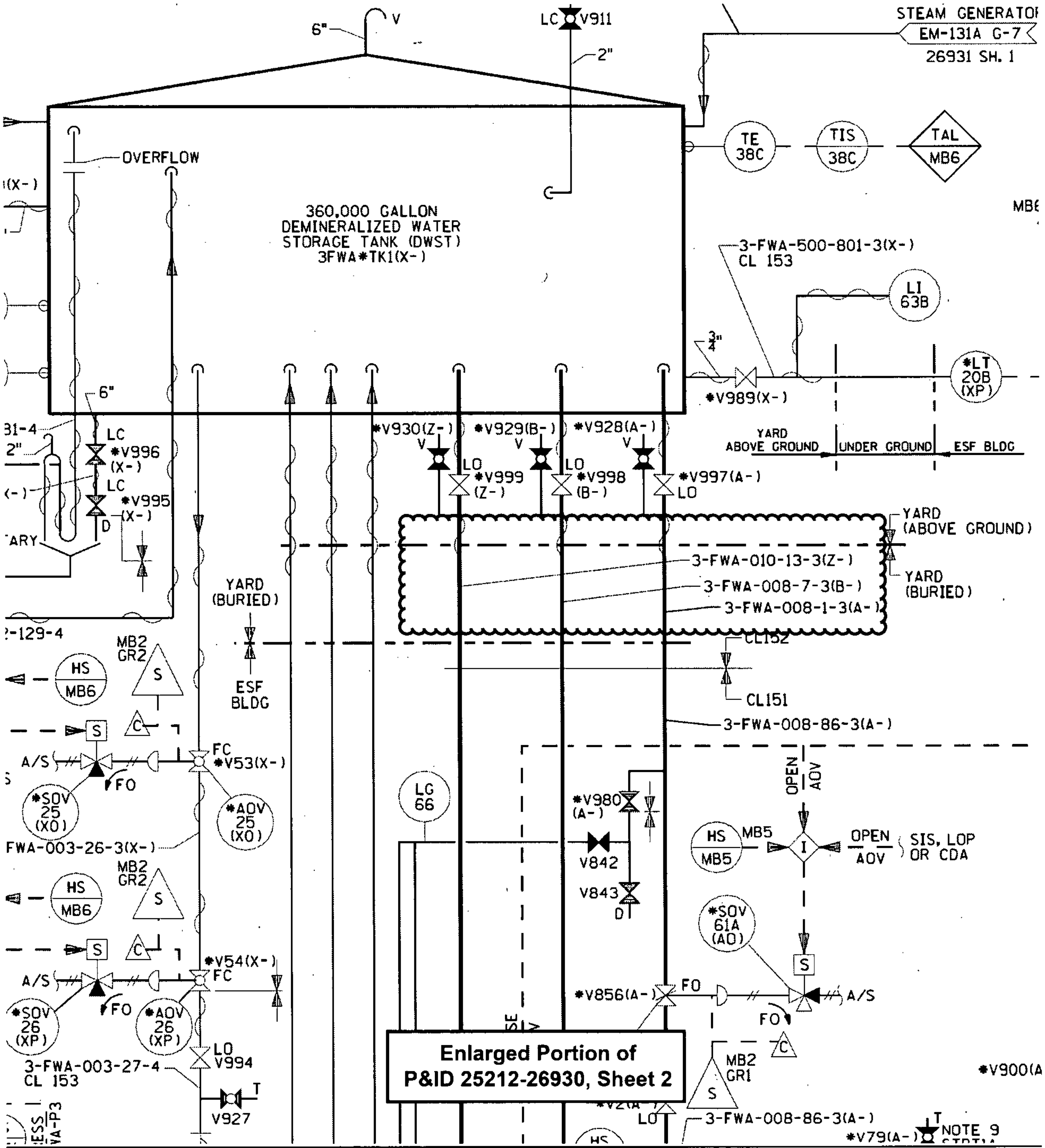
7. Precedents

A similar request for relief of buried Service Water piping was previously approved for Byron Station, Units 1 and 2 (Relief 13R-07) and Braidwood Station Units 1 and 2 (Relief 12R-46) by letter dated January 16, 2007, ADAMS Accession No. ML063260074. (Reference TAC NOS. MD1757, MD1758, MD1759 and MD1760). In addition, a similar relief request for the second interval at Millstone 3 (IR-2-40) was approved in letter 08-0437, dated July 10, 2008, ADAMS Accession No. ML081720069.



Enlarged Portion of
P&ID 25212-26912, Sheet 1


REFUELING WATER
STORAGE TANK
*TK1(X-)
TEST
NOZZLES
RWST
VALVE PIT
YARD
(BURIED)
INSIDE
PIT
*LT932
L-2
*LT930
N-2
*V987(X-)
*V959(X-)
3-QSS-750-802-2(X-)
3-QSS-750-800-2(X-)
3-QSS-750-803-2(X-)
3-QSS-750-801-2(X-)
3-QSS-012-1-2(X-)
3-QSS-014-21-2(A-)
3-QSS-014-19-2(B-)
3-SIL-024-153-2(Z-)
TE 23
TI 23
TAH MB2
3QSS-P1A
3QSS-P1B
B-4
REACTOR PLANT
CHILLED WTR SYS
OPEN 3CDS-SOV26
EM-122A F-1
26922 SH 1
TE 38
*LT933
L-4
*V986(X-)
*LT931
N-4
*V958(X-)
TE 37
TAL MB2
CLOSE
SIS
TRAIN A
HS MB1
*SOV 27 (XO)
*AOV 27 (XO)
A/S
FO
FC
*V9(X-)
HS MB1
CLOSE
SIS
TRAIN B
*AOV 28 (XP)
*SOV 28 (XP)
*V10(X-)
GR2
MB2
3QSS*P1A
3QSS*P1B
B-5
IN VALVE
PIT
IN YARD
(ABOVE GROUND)
*V32(Z-)
3-QSS-006-64-2(Z-)
3-QSS-006-46-2(Z-)
RM
*V5(B-)
LO
RM
*V1(A-)
LO
IN VALVE
PIT
IN YARD
(BURIED)
3-QSS-750-47-4
3-QSS-150-51-4
RAACT LIQ WASTE
& AERATED DRAINS
EM-106C E-5
26906 SH 3
MB2
3-QSS-014-26-2(B-)
3-QSS-014-22-2(A-)
PT 30A
PT 31A
Δ PW/LOOP
31
*V50(A-)
*V969
(A-)
*V51(A-)
*V934(A-)
*V52(A-)
*V964(A-)
*V965(A-)
REACTOR PLANT
CHILLED WTR SYS
CLOSE 3CDS-SOV26
EM-122A E-2
26922 SH 1
Enlarged Portion of
P&ID 25212-26915


360,000 GALLON
DEMINERALIZED WATER
STORAGE TANK (DWST)
3FWA*TK1(X-)
OVERFLOW
STEAM GENERATOR
EM-131A G-7
26931 SH. 1
TE 38C
TIS 38C
TAL MB6
3-FWA-500-801-3(X-)
CL 153
LI 63B
*LT 20B (XP)
*V989(X-)
YARD ABOVE GROUND
UNDER GROUND
ESF BLDG
*V930(Z-)
*V929(B-)
*V928(A-)
*V999 (Z-)
*V998 (B-)
*V997(A-)
*V996 (X-)
*V995 (X-)
YARD (ABOVE GROUND)
YARD (BURIED)
3-FWA-010-13-3(Z-)
3-FWA-008-7-3(B-)
3-FWA-008-1-3(A-)
CL152
CL151
3-FWA-008-86-3(A-)
YARD (BURIED)
ESF BLDG
*V53(X-)
*SOV 25 (XO)
*AOV 25 (XO)
FWA-003-26-3(X-)
LG 66
*V980 (A-)
V842
V843
HS MB5
OPEN AOV
SIS, LOP OR CDA
*SOV 61A (AO)
*V856(A-)
*V54(X-)
*SOV 26 (XP)
*AOV 26 (XP)
V994
V927
3-FWA-003-27-4
CL 153
Enlarged Portion of
P&ID 25212-26930, Sheet 2
3-FWA-008-86-3(A-)
*V79(A-)
NOTE 9
*V900(A

10 CFR 50.55a Request Number IR-3-07

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(ii)

--Hardship or Unusual Difficulty
Without Compensating Increase in Level of Quality or Safety--

1. ASME Code Components Affected

ASME Code Class:	Code Class 3
Reference:	ASME Section XI, IWA-5244(b)
Examination Category:	D-B
Item Number:	D2.10
Description:	MPS3 buried piping segments consist of two trains of buried 30" Service Water System (SWS) supply piping from the intake structure to the auxiliary building including branch lines to loads in the emergency diesel generator, control, and emergency safeguards buildings. This piping is carbon steel material clad with copper nickel and encased in concrete.
Components:	See Applicable Line Numbers Below

The applicable piping line numbers are identified as follows (Reference P&ID 25212-26933, Sheets 2 and 4. Excerpts of P&ID drawings are provided in Attachment 1 for information only.):

3SWP-030-191-3 /3SWP-030-190-3 (sheets 2 and 4)

3SWP-026-65-3 /3SWP-026-57-3 (sheets 2 and 4)

3SWP-012-24-3 /3SWP-012-13-3 (sheet 4)

3SWP-010-25-3 /3SWP-010-40-3 (sheet 4)

3SWP-006-31-3 /3SWP-006-226-3 (sheet 4)

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

The 2004 Edition of ASME Section XI requires that for "Buried Components" the pressure test requirements of IWA-5244(b) will be applied as follows:

For buried components where a VT-2 visual examination cannot be performed, the examination requirement is satisfied by the following:

(1) The system pressure test for buried components that are isolable by means of valves shall consist of a test that determines the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components. The acceptable rate of pressure loss or flow shall be established by the Owner.

(2) The system pressure test for nonisolable buried components shall consist of a test to confirm that flow during operation is not impaired.

(3) Test personnel need not be qualified for VT-2 visual examination.

4. Reason for Request

An alternative is requested from performing the pressure testing using the pressure loss or change in flow methods described in IWA-5244(b)(1) for the buried piping segments of the MPS3 SWS on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The buried piping segments of the MPS3 Class 3 SWS piping are bounded by butterfly valves that are not designed or expected to provide an adequate leak tight boundary that is necessary for an accurate pressure decay test, and extensive maintenance or system modification would be required to conduct this test. For example, the valves would need to be replaced with valves that have better leakage control characteristics, or the valves would need to be removed from the system and blind flanges installed.

The configuration of the piping segments do not provide for a sufficient straight length of pipe to properly install a flowmeter for accurate flow measurement at the ends of the buried pipe segments. Therefore, it is not possible to compare a change in flow between the ends of the buried components.

There is no annulus provided in which the areas at the ends of the buried components could be visually examined and there is no access to the buried sections without excavation.

5. Proposed Alternative and Basis for Use

5.1 Proposed Alternative

DNC proposes to use, as an alternative to the requirements of IWA-5244(b)(1), a verification of unimpaired flow in accordance with IWA-5244(b)(2) to provide an acceptable level of quality and safety. For each segment of the subject buried pipe, periodic flow testing will be performed in accordance with Inservice Test (IST) Program surveillance procedures. These surveillance procedures require flow to be measured, recorded and compared to established acceptance criteria to provide the assurance that flow is not impaired during operation.

5.2 Basis for Use

Flow testing of the four MPS3 SWS pumps is performed quarterly and will use the established minimum flow rate specified in the IST procedures as the acceptance criteria for the pressure testing of the associated SWS buried pipe segments. The flow rate is currently specified as 8820 gallons per minute (gpm).

If during the IST surveillances the minimum flows cannot be achieved, the pump(s) would be declared inoperable and a condition report initiated in accordance with the Millstone Power Station Corrective Action Program with further corrective actions, as required, to restore the pump(s) and/or system to an operable status.

Additionally, internal visual inspection is performed periodically during plant refueling outages, of the accessible buried pipe segments that are 18 inches in diameter and greater, to ensure the piping, coating, or lining is not experiencing unacceptable degradation.

Discussion on Acceptable Level of Quality or Safety or Hardship Without A Compensating Increase in the Level of Quality or Safety

Based on the hardship described above and the use of inservice flow testing to verify that flow through the buried piping is unimpaired, and in conjunction with the periodic internal visual inspections this alternative provides an acceptable level of quality and safety.

The hardship is considered to be without a compensating increase in the level of quality or safety for the following reasons:

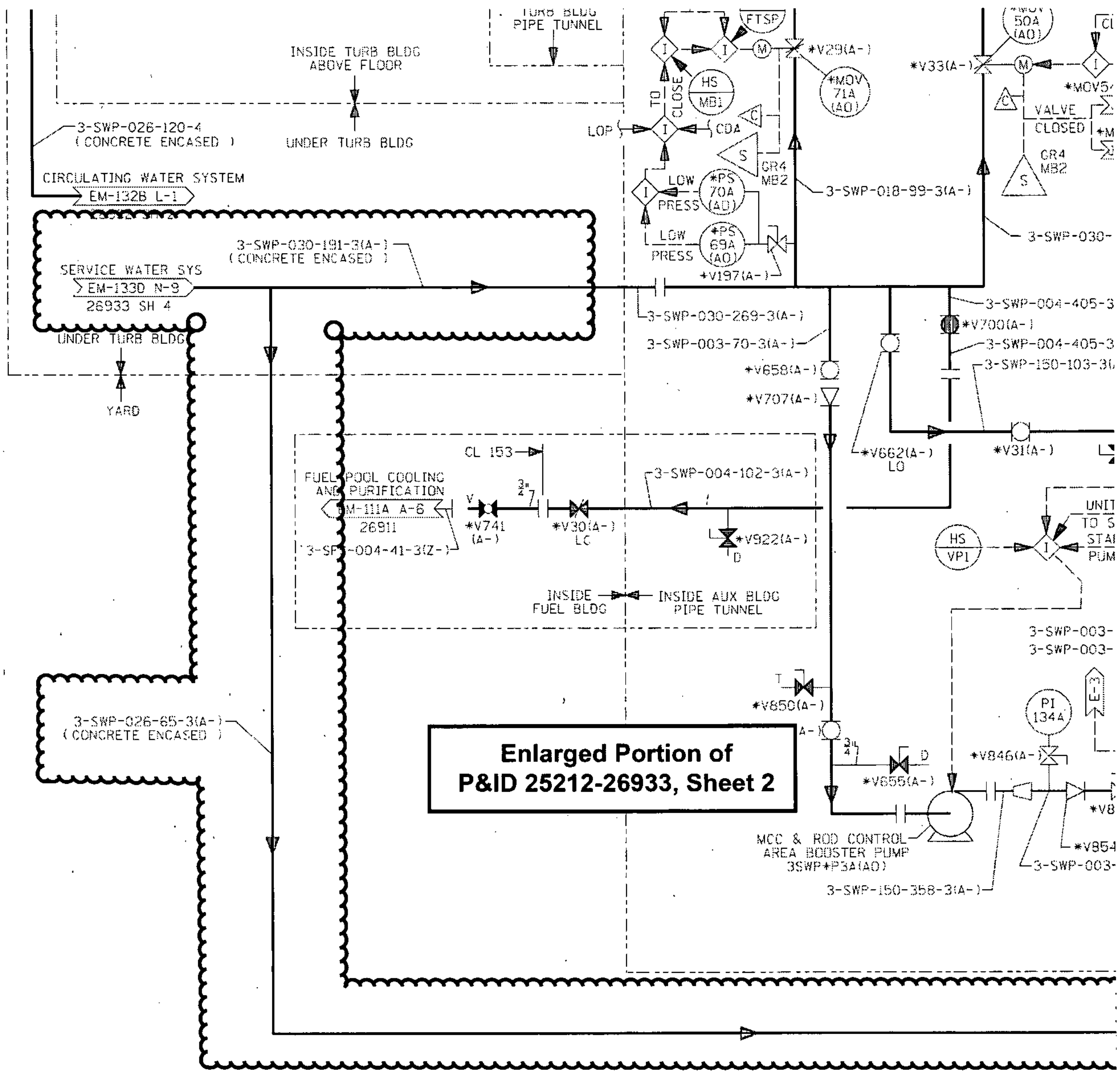
- These surveillance procedures require flow to be measured, recorded and compared to established acceptance criteria to provide the assurance that flow is not impaired during operation.
- Internal visual inspections ensure the piping, coating, or lining is not experiencing unacceptable degradation.
- The verification of unimpaired flow in accordance with IWA-5244(b)(2) provides an acceptable level of quality and safety considering the proposed alternatives and their basis for use.

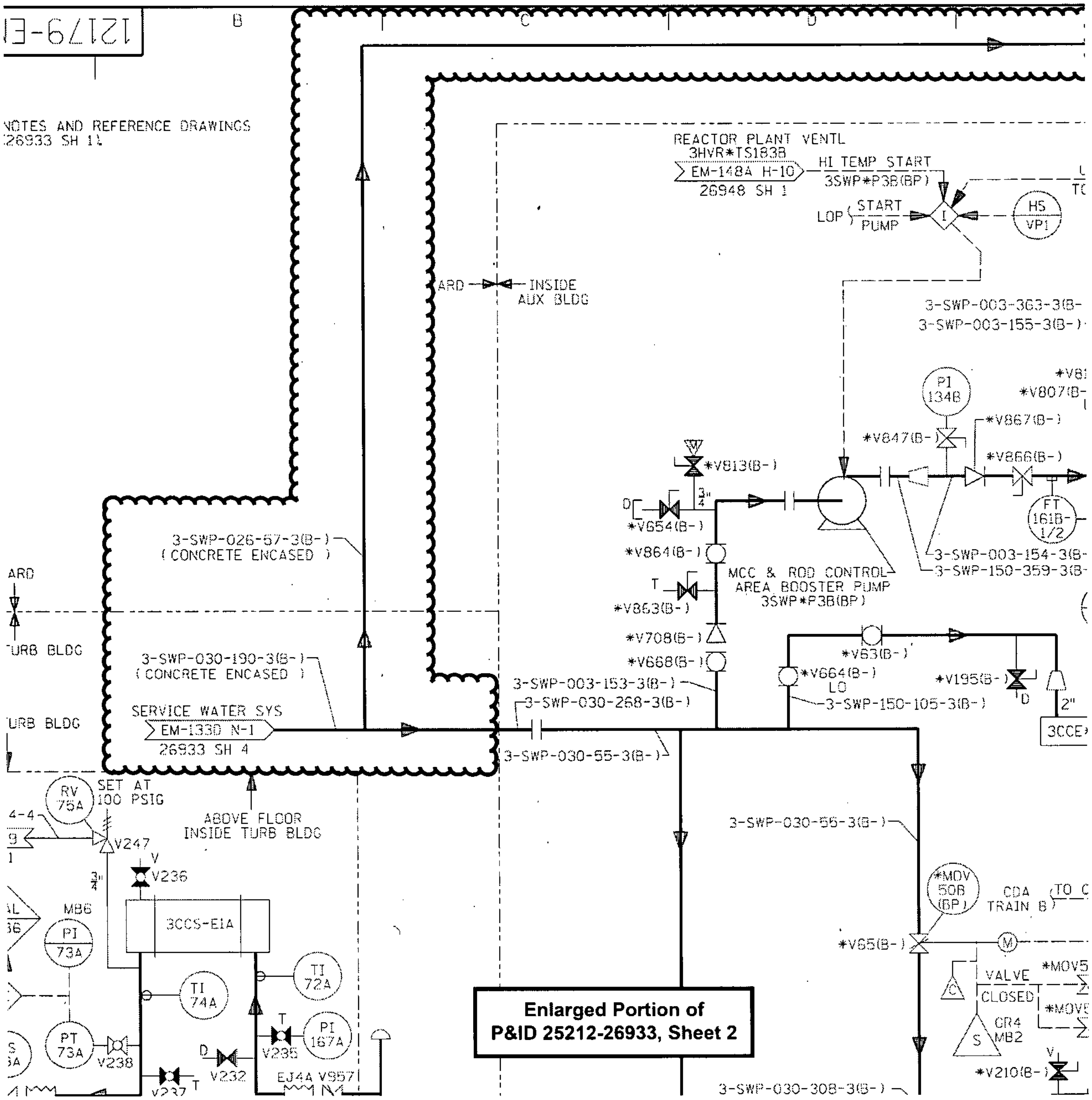
6. <u>Duration of Proposed Alternative</u>

This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019.

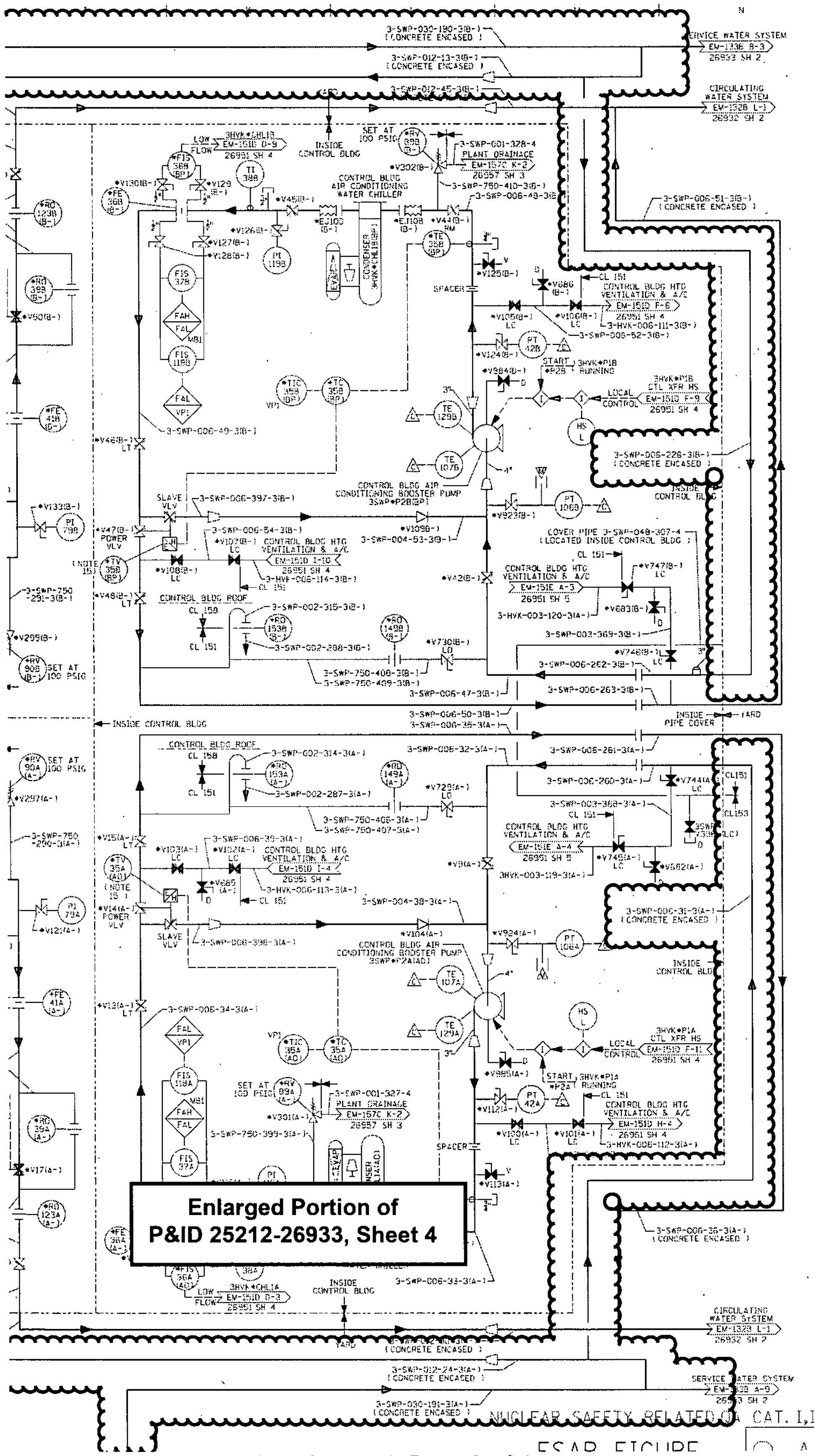
7. **Precedents**

A similar request for relief of buried Service Water piping was previously approved for Byron Station, Units 1 and 2 (Relief 13R-07) and Braidwood Station Units 1 and 2 (Relief 12R-46) by letter dated January 16, 2007, ADAMS Accession No. ML063260074. (Reference TAC NOS. MD1757, M01758, MD1759 and MD1760). In addition, a similar relief request for the second interval at Millstone 3 (IR-2-41) was approved in letter 08-0437, dated July 10, 2008, ADAMS Accession No. ML081720069.


PIPE TUNNEL
INSIDE TURB BLDG ABOVE FLOOR
UNDER TURB BLDG
3-SWP-026-120-4 (CONCRETE ENCASED)
CIRCULATING WATER SYSTEM
EM-132B L-1
3-SWP-030-191-3(A-) (CONCRETE ENCASED)
SERVICE WATER SYS
EM-133D N-9
26933 SH 4
UNDER TURB BLDG
YARD
FTSP
*V29(A-)
HS MB1
*MOV 71A (AO)
TO CLOSE
LOP
CDA
GR4 MB2
LOW PRESS
*PS 70A (AO)
*PS 69A (AO)
*V197(A-)
3-SWP-018-99-3(A-)
*V33(A-)
50A (AO)
VALVE CLOSED
GR4 MB2
3-SWP-030-
3-SWP-030-269-3(A-)
3-SWP-003-70-3(A-)
*V658(A-)
*V707(A-)
3-SWP-004-405-3
*V700(A-)
3-SWP-004-405-3
3-SWP-150-103-3
*V662(A-) LO
*V31(A-)
CL 153
FUEL POOL COOLING AND PURIFICATION
EM-111A A-6
26911
3-SWP-004-102-3(A-)
*V741 (A-)
*V30(A-) LC
*V922(A-)
3-SP-004-41-3(Z-)
INSIDE FUEL BLDG
INSIDE AUX BLDG PIPE TUNNEL
HS VP1
3-SWP-003-
3-SWP-003-
3-SWP-026-65-3(A-) (CONCRETE ENCASED)
*V850(A-)
PI 134A
*V846(A-)
*V855(A-)
Enlarged Portion of P&ID 25212-26933, Sheet 2
MCC & ROD CONTROL AREA BOOSTER PUMP 3SWP*P3A(AO)
3-SWP-150-358-3(A-)
3-SWP-003-

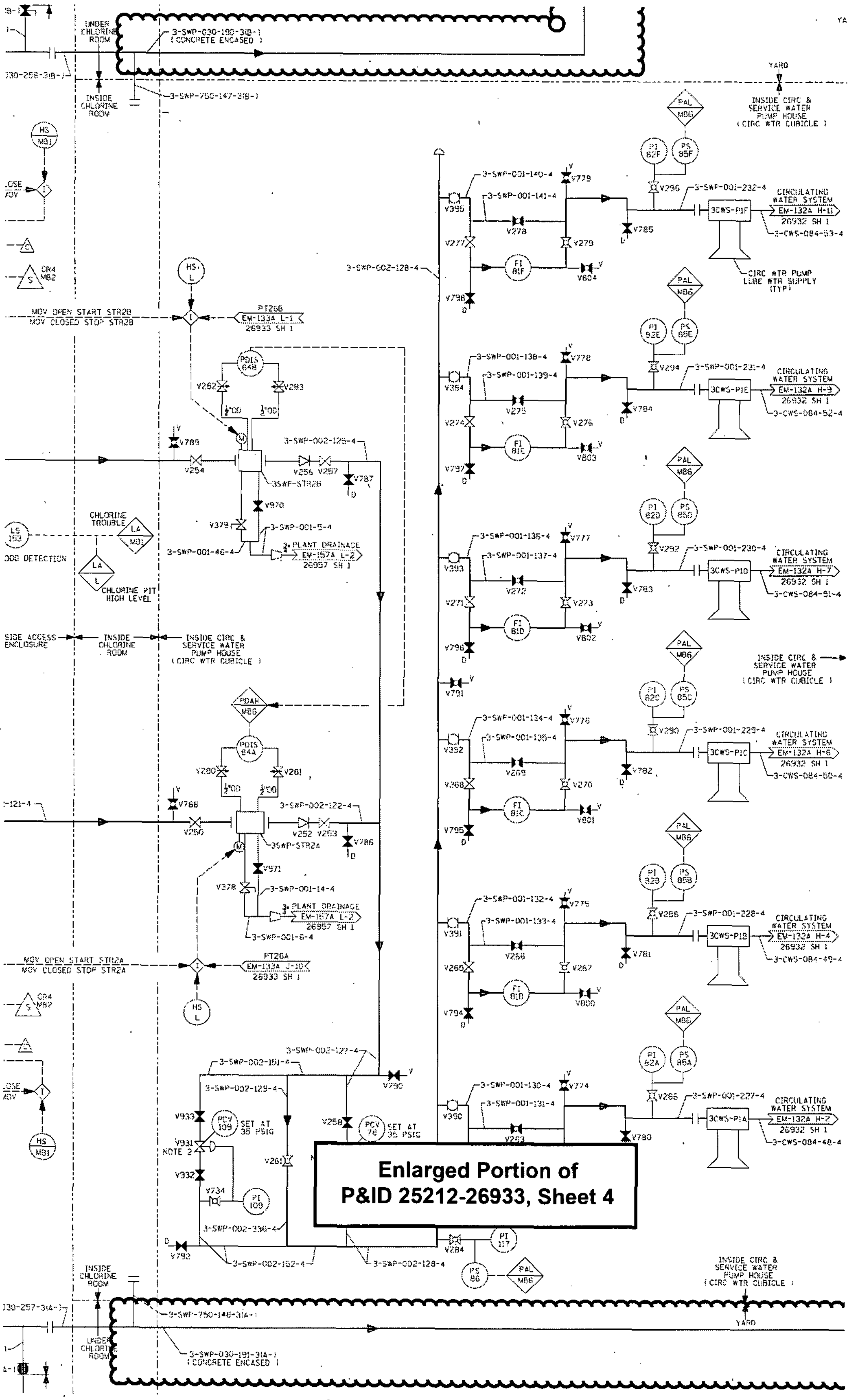


Enlarged Portion of P&ID 25212-26933, Sheet 2



Enlarged Portion of
P&ID 25212-26933, Sheet 4

10 CFR 50.55a Request Number IR-3-07
Attachment 1
(Continued)



10 CFR 50.55a Request Number IR-3-08

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1. ASME Code Components Affected

ASME Code Class:	Code Class 1
References:	ASME Section XI, Table IWB-2500-1 ASME Section XI, Appendix VIII, Supplements 4 and 6, 10 CFR 50.55a(b)(xv).
Examination Category:	B-A
Item Number:	B1.30
Description:	Implementation of Appendix VIII, Supplements 4 and 6 – Use of PDI Qualified Procedures, Personnel and Equipment for Non-Appendix VIII RPV Shell-to-Flange Weld
Components:	Reactor Pressure Vessel (RPV) Shell-to-Flange Weld No.101-121

2. Applicable Code Edition and Addenda

ASME Section XI, 2001 Edition (No Addenda) per 10CFR50.55a(b)(2)(xv) for Appendix VIII.

3. Applicable Code Requirement

The 2001 Edition with No Addenda of the American Society of Mechanical Engineers (ASME Code) Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," Subsection IWA-2232, requires ultrasonic (UT) examinations be performed in accordance with Mandatory Appendix I. Paragraph I-2110(b) of Mandatory Appendix I requires that examination of the RPV shell-to-flange weld to be in accordance with ASME Code, Section V, Article 4.

4. Reason for Request

The use of this alternative will allow the use of Performance Demonstration Initiative (PDI) qualified procedures for the performance of the ultrasonic testing examination of the reactor pressure vessel (RPV) shell-to-flange weld from the vessel side of the weld in accordance with ASME Code, Section XI, Division 1, 2001 Edition, No Addenda, Appendix VIII, Supplements 4 and 6. This alternative would be used in lieu of Article 4 of Section V requirements.

5. Proposed Alternative and Basis for Use

DNC proposes to perform ultrasonic examinations of the RPV shell-to-flange weld using procedures, personnel, and equipment that have been demonstrated and qualified in accordance with ASME Section XI, 2001 Edition, No Addenda, Appendix VIII, Supplements 4 and 6 as amended by 10 CFR 50.55a and the PDI Program. Since the examination will be performed from a single side due to the weld configuration, all procedures, personnel, and equipment will be qualified for single sided access for examination of this weld.

Appendix VIII requirements were developed and adopted to ensure the effectiveness of ultrasonic examinations within the nuclear industry by means of a rigorous, item specific performance demonstration containing flaws of various sizes, locations, and orientations. The performance demonstration process has established with a high degree of confidence, the capability of personnel, procedures, and equipment to detect and characterize flaws that could be detrimental to the structural integrity of the RPV. The PDI approach has demonstrated that for detection and characterization of flaws in the RPV the ultrasonic examination techniques are equal to or surpass the requirements of the ASME Section V, Article 4 ultrasonic examination requirements. Though Appendix VIII is not required for the RPV shell-to-flange weld examination, the use of Appendix VIII, Supplements 4 and 6 criteria for detection and sizing of flaws in this weld will be equal to or exceed the requirements of ASME Section V, Article 4. Therefore, the use of the proposed alternative will continue to provide an acceptable level of quality and safety, and approval is requested pursuant to 10 CFR 50.55a(a)(3)(i).

6. Duration of Proposed Alternative

This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019.

7. Precedents

A similar relief request (RR ISI-30) was previously approved for Union Electric Company for its Callaway Plant, Unit 1 on April 7, 2004 (ADAMS Accession Nos. ML032340608 and ML041 000516). In addition, Relief Request IR-2-44 was approved for Millstone 3 for use during the Second Interval in a letter from the NRC (Serial No. 07-0368) dated May 1, 2007 (ADAMS Accession No. ML070740465).

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i) and 10 CFR 50.55a(a)(3)(ii)

--Alternative Provides Acceptable Level of Quality and Safety and Compliance with the Specified Requirements Result in a Hardship without a Compensating Increase in the Level of Quality and Safety--

1. ASME Code Components Affected

ASME Code Class:	Code Class 1
References:	ASME Section XI, Table IWB-2500-1 and IWB-5222(b)
Examination Category:	B-P
Item Number:	B15.10
Description:	Use of Alternative Pressure Testing Criteria for the System Leakage Test Conducted at or Near the End of the Inspection Interval on Class 1 Piping
Systems:	Pressurizer Auxiliary Spray Reactor Head Vent Reactor Coolant Low Pressure Safety Injection High Pressure Safety Injection Residual Heat Removal
Component(s):	41 Reactor Coolant Pressure Boundary (RCPB) piping segments primarily consisting of small bore ≤ 2" Nominal Pipe Size (NPS) piping vents, drains, and branch (VTDB) lines and connections. Additional segments are portions of larger diameter piping 6", 8", 10" and 12" NPS located between check valves and isolated, required to be isolated at operation or otherwise continually under pressure and monitored for loss of pressure. Details related to these piping segments are provided by Tables 1 through 5 in Section 4.0 and Attachment 1.

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

IWB-2500, Table IWB-2500-1, Code Category B-P, Item Number B15.10 requires that all Class 1 pressure retaining components be Visual, VT-2 examined each refueling outage. The required system pressure test can be either a hydrostatic test or a system leakage test. The system leakage test is performed at a pressure not less than the pressure corresponding to

100% rated reactor power. Per IWB-5222(a), the pressure retaining boundary during the system leakage test shall correspond to the reactor coolant boundary, with all valves in the position required for normal reactor operation startup. The visual examination shall, however, extend to and include the second closed valve at the boundary extremity. Per IWB-5222(b), the pressure retaining boundary during the system leakage test conducted at or near the end of the interval shall extend to all Class 1 pressure retaining components within the system boundary.

4. Reason for Request

The IWB-5222(b) system pressure test which is performed once per ten-year interval is the subject of this request. The IWB-5222(b) test requires that portions of the Class 1 system which are not normally pressurized to the RCS pressure associated with 100% rated reactor power be pressurized to that pressure. Reasons for this request are grouped in Component Groups 1 through 5 and described in Sections 4.1 through 4.5. The following is a summary list of names for these groups of piping segments.

Group	Piping Segment Summary Name
1	Small bore ≤ 2" NPS piping vents, drains, and branch (VTDB) lines and connections in the Reactor Coolant and Reactor Head Vent Systems
2	Low Pressure Safety Injection (LPSI) header pipe segments
3	Safety Injection to RCS Cold and Hot Legs
4	Residual Heat Removal (RHS) Suction
5	Auxiliary Pressurizer Spray

4.1 <u>Component Group 1: "Small bore ≤ 2" NPS piping vents, drains, and branch (VTDB) lines and connections in the Reactor Coolant and Reactor Head Vent Systems"</u> - The component Group 1 piping segments 1-29 are shown in Table 1. Additional details are in Attachment 1, Table 1.

Table 1: Affected Piping Segments of Group 1

Segment	Description	Segment Boundary [(1)]	Dia. (in)	Length (ft)
M3-1	RCS Loop 1 Fill Line	3RCS*V24 to 3RCS*V23 (AV8036A)	2	<1
M3-2	RCS Loop 2 Fill Line	3RCS*V99 to 3RCS*V100 (AV8036C)	2	<1
M3-3	RCS Loop 3 Fill Line	3RCS*V68 to 3RCS*V67 (AV8036B)	2	<1
M3-4	RCS Loop 4 Fill Line	3RCS*V140 to 3RCS*V141 (AV8036D)	2	<1
M3-5	Loop 1 Drains to Primary Drain Header	3RCS*V202 / 3RCS*V203 to Line 3-RCS-002-148-1	2	81
M3-6	Loop 2 Drains to Primary Drain Header	3RCS*V205 / 3RCS*V206 to Line 3-RCS-002-148-1	2	65
M3-7	Loop 3 Drains to Primary Drain Header	3RCS*V208 / 3RCS*V209 to Line 3-RCS-002-148-1	2	83
M3-8	Loop 4 Drains to Primary Drain Header	3RCS*V211 / 3RCS*V212 to Line 3-RCS-002-148-1	2	137
M3-9	Primary Loop Drain Header	3RCS*V213 to 3RCS*V198 and 3RCS*V898	2, 1	236
M3-10	Primary Loop Drain Header Drain	3RCS*V895 to 3RCS*V898 and 3RCS*V899	1, ¾	2
M3-11	Loop 1 T-Cold Stop Valve Disk Pressure Connection	3RCS*V989 to flange	¾	<1
M3-12	Loop 1 T-Cold Stop Valve Disk Pressure Connection	3RCS*V990 to flange	¾	<1
M3-13	Loop 1 T-Hot Stop Valve Disk Pressure Connection	3RCS*V991 to flange	¾	<1
M3-14	Loop 1 T-Hot Stop Valve Disk Pressure Connection	3RCS*V992 to flange	¾	<1
M3-15	Loop 3 T-Cold Stop Valve Disk Pressure Connection	3RCS*V979 to flange	¾	<1
M3-16	Loop 3 T-Cold Stop Valve Disk Pressure Connection	3RCS*V980 to flange	¾	<1
M3-17	Loop 3 T-Hot Stop Valve Disk Pressure Connection	3RCS*V981 to flange	¾	<1
M3-18	Loop 3 T-Hot Stop Valve Disk Pressure Connection	3RCS*V982 to flange	¾	<1

Table 1: Affected Piping Segments of Group 1 (Continued)				
Segment	**Description**	**Segment Boundary** [(1)]	**Dia.** (in)	**Length** (ft)
M3-19	Loop 2 T-Cold Stop Valve Disk Pressure Connection	3RCS*V984 to flange	¾	<1
M3-20	Loop 2 T-Cold Stop Valve Disk Pressure Connection	3RCS*V985 to flange	¾	<1
M3-21	Loop 2 T-Hot Stop Valve Disk Pressure Connection	3RCS*V986 to flange	¾	<1
M3-22	Loop 2 T-Hot Stop Valve Disk Pressure Connection	3RCS*V987 to flange	¾	<1
M3-23	Loop 4 T-Cold Stop Valve Disk Pressure Connection	3RCS*V974 to flange	¾	<1
M3-24	Loop 4 T-Cold Stop Valve Disk Pressure Connection	3RCS*V975 to flange	¾	<1
M3-25	Loop 4 T-Hot Stop Valve Disk Pressure Connection	3RCS*V976 to flange	¾	<1
M3-26	Loop 4 T-Hot Stop Valve Disk Pressure Connection	3RCS*V977 to flange	¾	<1
M3-27	Reactor Vessel Head Vent Line	3RCS*V958 to flange	1	1
M3-28	Reactor Vessel Head Vent Line Drain	3RCS*V956 to flange	1	1
M3-29	Loop 1 TC Instrument Line	3RCS*V33 to 3RCS*V34 and V35	2, ¾	3
NOTE:	1. The segment boundaries are described in terms of valve-to-valve unless otherwise annotated for a flange or line designation.			

Each of these VTDB lines and connections are equipped with manual valves, which provide double isolation of the RCPB. These valves are generally maintained closed during normal operation. The piping outboard of the first isolation valve is not normally pressurized. Under normal operating conditions, these VTDB lines and connections, except for the low pressure safety injection (LPSI) VTDB lines and connections, are subject to reactor coolant system (RCS) pressures and temperatures only if leakage through the inboard valves occurs. For the LPSI VTDB lines and connections, leakage at inboard valves will only result in pressures associated with the pressure of the safety injection tanks.

Because these VTDB lines and connections typically do not have test connections that would allow them to be individually pressure tested without design modifications, it will be necessary to open the inboard valves to pressurize these VTDB lines and connections to perform the IWB-5222(b) system pressure test. Pressurization by this method defeats the double isolation feature and presents significant personnel safety concerns for the personnel performing the test on the valves that are at normal RCS pressure and temperature.

Performing this test with the inboard isolation valves open requires several man-hours to position or cycle these valves for the test and restore the valves after the test is complete. Most of these valves are located in close proximity to the RCS loop piping and thus require personnel entry into high radiation areas within the containment. Based on previous outage data, estimated radiation exposure associated with valve alignment and realignment would result in an additional 1.9 man-Rem. Since this test would be performed near the end of an outage when all RCPB work has been completed, the time required opening and closing the valves on these VTDB lines and connections could impact the outage schedule.

4.2 Component Group 2: "Low Pressure Safety Injection (LPSI) header pipe segments" - The component Group 2 piping segments (30 through 33) are shown in Table 2. Additional details are in Attachment 1, Table 2.

Table 2: Affected Piping Segments of Group 2

Segment	**Description**	**Segment Boundary** (1)	**Dia.** (in)	**Length** (ft)
M3-30	Loop 1 LPSI Header	3RCS*V30 to 3SIL*V15 & 3SIL*V987	6 10	15
M3-31	Loop 2 LPSI Header	3RCS*V107 to 3SIL*V19 & 3SIL*V985	6 10	20
M3-32	Loop 3 LPSI Header	3RCS*V71 to 3SIL*V17 & 3SIL*V986	6 10	20
M3-33	Loop 4 LPSI Header	3RCS*V146 to 3SIL*V21 & 3SIL*V984	6 10	20
NOTE:	1. Segment boundary is described in terms of valve-to-valve.			

The pipe segments of Group 2 are part of the LPSI system at MPS3 and are continuously pressurized because they are in the injection flow path from the safety injection tanks.

In order to perform the IWB-5222(b) system pressure test on these pipe segments it would be necessary to connect jumpers circumventing the inboard check valve boundaries from the RCS. This is a significant personnel safety hazard that results in an estimated additional 0.2 man-Rem of unnecessary personnel radiation exposure.

4.3 <u>Component Group 3: "Safety Injection to RCS Cold and Hot Legs"</u> - The component Group 3 piping segments (34 through 38) are shown in Table 3. Additional details are in Attachment 1, Table 3.

Table 3: Affected Piping Segments of Group 3

Segment	Description	Segment Boundary (1)	Dia. (in)	Length (ft)
M3-34	SI to Loop 1 Hot Leg	3SIH*V110 to 3RCS*V26	2, 6	200
M3-35	SI to Loop 2 Hot Leg	3SIH*V112 to 3RCS*V102	2, 6	208
M3-36	SI to Loop 3 Hot Leg	3SIL*V27 and 3SIL*V26 to 3RCS*V69	2, 6, 8	275
M3-37	SI to Loop 4 Hot Leg	3SIL*V29 and 3SIL*V28 to 3RCS*V142	2, 6, 8	101
M3-38	SI to (4) Cold Legs	3SIH*V5 to 3RCS*V29, 3RCS*V106, 3RCS*V70, and 3RCS*V145	1.5, 3	758
NOTE:	1. Segment boundary is described in terms of valve-to-valve.			

The pipe segments of Group 3 are in high pressure and low pressure Safety Injection (HPSI, LPSI) systems, in portions of piping between check valves that are not normally pressurized during plant operation.

In order to pressurize these segments to perform the IWB-5222(b) system pressure test it would be necessary to connect jumpers circumventing the inboard check valve boundaries from the RCS. This is a significant personnel safety hazard and results in an estimated additional 0.375 man-Rem of unnecessary personnel radiation exposure.

4.4 <u>Component Group 4: "Residual Heat Removal (RHS) Suction"</u> - The component Group 4 piping segments (39, 40) are shown in Table 4. Additional details are in Attachment 1, Table 4.

Table 4: Affected Piping Segments of Group 4

Segment	Description	Segment Boundary (1)	Dia. (in)	Length (ft)
M3-39	A RHS Suction Line	3RCS*V999 to 3RHS*V997 (8701A)	12	59
M3-40	B RHS Suction Line	3RCS*V998 to 3RHS*V996 (8702B)	12	59
NOTE:	1. Segment boundary is described in terms of valve-to-valve.			

The pipe segments 39 and 40 are part of the RHS system, which is not pressurized during normal plant operation. In order to pressurize this segment to perform the IWB-5222(b) system pressure test it would be necessary to open the isolation valves 3RHS*8701C ("A" train) and 3RHS*8702C ("B" train). These isolation valves are required to be closed when the plant is in Modes 1, 2, and 3, as described in the MPS3 Final Safety Evaluation Report (FSAR) Section 5.4.7.1. Alternatively, temporary high pressure hoses with a hydrostatic pump would need to be installed to pressurize these segments during a refuel outage, which would introduce a significant personnel safety hazard if the connection or hose fails in the presence of inspection personnel.

4.5 Component Group 5: "Auxiliary Pressurizer Spray" - The component Group 5 piping segment (41) is described in Table 5 and additional details are in Attachment 1, Table 5.

Table 5: Affected Piping Segments of Group 5

Segment	Description	Segment Boundary [1]	Dia. (in)	Length (ft)
M3-41	Auxiliary Pressurizer Spray	3RCS*V174 (AV8145) to 3RCS*V175	2	230
NOTE:	1. Segment boundary is described in terms of valve-to-valve.			

Segment 41 is part of the MPS3 auxiliary pressurizer spray line, which is not normally pressurized. In order to pressurize this segment to perform the IWB-5222(b) system pressure test it would be necessary to open the normally closed upstream isolation valve 3RCS*MV8145. Water in this line is supplied from the charging system with an operating pressure greater than the RCS normal operating pressure. Opening this valve would allow water in the auxiliary pressurizer spray line, which is at containment ambient temperature, to pass through a check valve into the main spray header and through the spray nozzle into the pressurizer. With the RCS at normal operating temperature, this test would create a thermal shock transient to the spray nozzle, which has been evaluated to be in excess of 320 degrees F. The pressurizer stress report for MPS3 has evaluated spray nozzle shock as a design basis transient, but based on the temperature severity, this test could result in the most severe case of which only 10 cycles were considered in the stress analysis.

5. Proposed Alternative and Basis for Use

The alternatives and basis for the MPS3 request are organized by component group discussions in the balance of this section. The provisions of 10 CFR 50.55a(a)(3)(i) permit requests for alternatives in some of these component groups because the request provides for an acceptable level of quality and safety. For other component groups, the provisions of 10 CFR 50.55a(a)(3)(ii) permit alternative requests when the specified requirements result in a hardship without a compensating increase in the level of quality and safety. The following list summarizes the application of these provisions in this request for relief. Refer to Tables 1 through 5 of both Section 4.0 and Attachment 1 for additional details regarding piping segment component groups and requested alternatives.

Group	10 CFR 50.55a Provision	Section
1	(a)(3)(ii)	5.1
2	(a)(3)(i)	5.2
3	(a)(3)(ii)	5.3
4	(a)(3)(ii)	5.4
5	(a)(3)(ii)	5.5

5.1 Alternative and Basis for Component Group 1

MPS3 Group 1 segments 1-29 are VTDB lines and connections that are equipped with manual valves, which provide double isolation of the RCPB. As an alternative to the IWB-5222(b) system pressure test requirements for these RCPB pipe segments, this request proposes to perform an ASME Code Section XI, Table IWB-2500-1 and IWB-5221 system leakage test with the isolation valves in the normally closed position. This examination will be performed at the nominal operating pressure associated with 100% reactor power after satisfying the ASME Code required hold time.

Basis for approval of this alternative includes the following information:

5.1.1. The non-isolable portion of the RCPB VTDB lines and connections will be pressurized and will be visually examined as required. Only the isolable portion of these small diameter VTDB lines and connections will not be pressurized, but a VT-2 examination will still be performed in these cases.

5.1.2. A typical VTDB line and connection includes two manual valves or one manual valve, separated by a short piece of pipe or a pipe nipple, which is connected to the RCPB via another short pipe nipple. These connections are typically socket welded and the welds receive a surface examination after installation. The piping and valves are normally heavy walled. The VTDB lines and connections are not subject to high or cyclic loads and design ratings are greater than RCPB operating pressure.

5.1.3. MPS3 uses the ASME Code Section XI, 2004 Edition (No Addenda) for its Section XI Repair/Replacement program activities, but the requirements exclude components or connections NPS 1 and smaller from the pressure test requirement after welded repairs. Therefore, requiring a pressure test and visual examination of the NPS 1 and smaller of Group 1 Class 1 RCPB VTDB lines and connections once each 10-year interval is unwarranted considering that pressure testing a repair weld on the same connections is not required by the ASME Code, Section XI.

Considering this information and the implications for personnel safety and radiation exposure that would occur as a result of meeting the ASME Code Section XI, 2004 Edition, pressure test requirements, compliance with the pressure test requirements for Groups 1 RCPB VTDB lines and connections results in an unnecessary hardship without a sufficient compensating increase in the level of quality and safety. Therefore, DNC requests approval of this alternative pursuant to 10CFR50.55a(a)(3)(ii).

5.2 Alternative and Basis for Component Group 2

Group 2 segments (30 through 33) are part of the LPSI system and are continuously pressurized and monitored for loss of pressure because they are in the open injection flow path from the safety injection tanks. As an alternative to the pressure test requirements for these RCPS pipe segments, DNC proposes to use the pressure associated with the statically pressurized passive safety injection system.

The basis for approval of this alternative includes the following information. ASME approved Code Case N-731 , "Alternative Class 1 System Leakage Test Pressure Requirements Section XI, Division 1," on February 22, 2005 (see Attachment 2), because it believed that detection of leakage from a through-weld or through-wall flaw is affected by pressure, temperature, and time, with time being the controlling factor. Since the requirements of Code Case N-731 limit its application to safety injection systems that must be under pressure for an entire operating cycle there appears to be no reason to have the pressure elevated to full RCS pressure to prove leakage integrity for this piping.

Because this alternative for Group 2 is specific to the LPSI piping at MPS3 that is continuously under pressure for the entire operating cycle, continually monitored for loss of pressure, and is included in the scope of the ASME approved Code Case N-731, use of this alternative provides an acceptable level of quality and safety. Therefore, DNC requests approval to use Code Case N-731 pursuant to 10 CFR 50.55a(a)(3)(i).

5.3 Alternative and Basis for Component Group 3

The Group 3 piping segments 34-38 of MPS3 are part of the safety injection system that are located between check valves that isolate these segments from RCS pressure. As an alternative to the IWB-5222(b) system pressure test for these RCPB pipe segments, DNC proposes to perform this test using a reduced test pressure during the full flow check valve tests of these segments, during the refuel outage with the RCS depressurized.

The basis for approval of this alternative is included in the following information.

In order to pressurize these segments to meet the IWB-5222(b) system pressure test requirements, it would be necessary to connect jumpers (high pressure hose) circumventing the inboard check valve boundaries from the RCS. This is a significant personnel safety hazard and will result in unnecessary personnel radiation exposure.

Considering this information, compliance with these requirements for Group 3 RCPB pipe segments results in unnecessary hardship without sufficient compensating increase in the level of quality and safety. Therefore, DNC requests approval of this alternative pursuant to 10 CFR 50.55a(a)(3)(ii).

5.4 Alternative and Basis for Component Group 4

The Group 4 piping segments 39 and 40 are in the RHS system and are not pressurized during normal plant operation. As an alternative to the IWB-5222(b) system pressure test requirements for these RCPB pipe segments, DNC proposes to perform this test using a reduced test pressure prior to the valves being closed, isolating these segments in the normal preparation for mode change during startup.

The basis for approval of this alternative is included in the following information.

a) In order to pressurize this segment to meet the IWB-5222(b) system pressure test requirements, it would be necessary to open the isolation valves 3RHS*8701 C ("A" train) and 3RHS*8702C ("B" train). These isolation valves are required to be closed when the plant is in Modes 1, 2, and 3 as described in the MPS3 FSAR Section 5.4.7.1 and plant operational procedures.

b) Alternatively, to install temporary high pressure hoses with a hydrostatic pump to pressurize these segments during the refuel outage would add additional personnel exposure and introduce a significant personnel safety hazard if the connection or hose fails in the presence of inspection personnel.

Considering this information, compliance with the IWB-5222(b) system pressure test requirements for Group 4 RCPB pipe segments, results in unnecessary hardship without sufficient compensating increase in the level of quality and safety. Therefore, DNC requests approval of this alternative pursuant to 10 CFR 50.55a(a)(3)(ii).

5.5 Alternative and Basis for Component Group 5

The RCPB pipe segment 41 at MPS3 is part of the auxiliary pressurizer spray line, which is not normally pressurized during plant operation. As an alternative to the IWB-5222(b) system pressure test requirements for these RCPB pipe segment, DNC proposes to perform this test at a reduced pressure when pressurizer spray is initiated for normal plant cooldown in accordance with plant operating procedures.

The basis for approval of this alternative is included in the following information.

In order to pressurize this segment to meet the IWB-5222(b) system pressure test requirements, it would be necessary to open the normally closed upstream isolation valve 3RCS*MV8145. Opening this valve would allow water in the auxiliary pressurizer spray line, which is at containment ambient temperature, to pass through a check valve into the main spray header and through the spray nozzle into the pressurizer. With the RCS at normal operating temperature this would create a thermal shock transient to the spray nozzle.

Considering this information, compliance with the IWB-5222(b) system pressure test requirements for the Group 3 piping segment for MPS3 results in an unnecessary hardship and adverse impact to plant equipment without a sufficient compensating increase in the level of quality and safety. Therefore, DNC requests approval of this alternative pursuant to the provisions of 10CFR50.55a(a)(3)(ii).

6.0 Duration of Proposed Alternative

This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019.

7.0 Precedents

With the exception of the use of ASME Code Case N-731, similar alternatives to the hydrostatic test requirements of the ASME Code Section XI, 1989 Edition, IWB-5222 have been approved for Indian Point Units 2 and 3 and for the 1998 Edition with the 2000 Addenda for the 10-year ISI interval leakage test pressure per IWB-5220 for Surry Units 1 and 2. The differences in the Code requirements taken to establish the basis for the approval of these requests result in the same approved objective of not having to pressure test portions of the Class 1 RCPB to full RCS pressure and reduced pressures for other piping segments. Both of the safely evaluations for these precedent requests are cited below from ADAMS.

1. Indian Point Nuclear Generating Units 2 and 3, dated December 7, 2005, (ADAMS Accession No. ML053110525).
2. Surry Units 1 and 2, Relief, dated November 1, 2005, (ADAMS Accession No. ML052930032).

In addition, Relief Request IR-2-45 was approved for MPS3 for use during the second inspection interval on September 27, 2007, (ADAMS Accession No. ML072620318).

8.0 References

1. 2004 Edition, ASME Code, Section XI, No Addenda.
2. ASME Code Case N-731, "Alternative Class 1 System Leakage Test Pressure Requirements Section XI, Division 1".

ATTACHMENT 1

USE OF ALTERNATIVE CLASS 1 PRESSURE TEST REQUIREMENTS ALTERNATIVE REQUEST IR-3-09

PIPE SEGMENT DETAILS OF COMPONENT GROUPS 1 THROUGH 5

TABLE 1 – COMPONENT GROUP 1 PIPING DETAILS

Segment Number [1]	Drawing	Line Number [2]	Other ISI Examinations	Request [3]	Dose [4] Savings Estimate (MR)
M3-1	26902 Sh. 1	3-RCS-002-128-1	None	Relief is from using valve 3RCS*V024 to pressurize downstream pipe and valve.	5
M3-2	26902 Sh. 2	3-RCS-002-136-1	None	Relief is from using valve 3RCS*V099 to pressurize downstream pipe and valve.	10
M3-3	26902 Sh. 4	3-RCS-002-131-1	None	Relief is from using valve 3RCS*V068 to pressurize downstream pipe and valve.	10
M3-4	26902 Sh. 5	3-RCS-002-14-1	None	Relief is from using valve 3RCS*V140 to pressurize downstream pipe and valve.	10
M3-5	26902 Sh. 6	3-RCS-002-172-1 3-RCS-002-173-1	None	Relief is from using valve 3RCS*V203 to pressurize downstream pipe and valve.	15
M3-6	26902 Sh. 6	3-RCS-002-172-1 3-RCS-002-173-1	None	Relief is from using valve 3RCS*V206 to pressurize downstream pipe and valve.	15
M3-7	26902 Sh. 6	3-RCS-002-172-1 3-RCS-002-173-1	Examinations of welds RCS-176-FW-31, FW-32, FW-33, FW-34, and FW-38	Relief is from using valve 3RCS*V209 to pressurize downstream pipe and valve.	15
M3-8	26902 Sh. 6	3-RCS-002-172-1 3-RCS-002-173-1	Examinations of welds RCS-178-FW-9, FW-10, FW-11, FW-12, and 407302-FW-5	Relief is from using valve 3RCS*V212 to pressurize downstream pipe and valve.	15
M3-9	26902 Sh. 6	3-RCS-002-148-1 3-RCS-001-113-1 3-RCS-001-245-1	None	Relief is from using any of the loop drain isolation valves to pressurize downstream pipe and valves.	15
M3-10	26902 Sh. 6	3-RCS-001-246-1 3-RCS-001-247-1 3-RCS-750-214-1	None	Relief is from using valve 3RCS*V898 to pressurize downstream pipe and valves.	15

TABLE 1 – COMPONENT GROUP 1 PIPING DETAILS (Continued)

Segment Number (1)	Drawing	Line Number (2)	Other ISI Examinations	Request (3)	Dose (4) Savings Estimate (MR)
M3-11	26902 Sh. 1	3RCS*MV8002A(5)	None	Relief is from using valve 3RCS*V989 to pressurize downstream pipe and flange.	100
M3-12	26902 Sh. 1	3RCS*MV8002A(5)	None	Relief is from using valve 3RCS*V990 to pressurize downstream pipe and flange.	100
M3-13	26902 Sh. 1	3RCS*MV8001A(5)	None	Relief is from using valve 3RCS*V991 to pressurize downstream pipe and flange.	100
M3-14	26902 Sh. 1	3RCS*MV8001A(5)	None	Relief is from using valve 3RCS*V992 to pressurize downstream pipe and flange.	100
M3-15	26902 Sh. 2	3RCS*MV8002C(5)	None	Relief is from using valve 3RCS*V979 to pressurize downstream pipe and flange.	100
M3-16	26902 Sh. 2	3RCS*MV8002C(5)	None	Relief is from using valve 3RCS*V980 to pressurize downstream pipe and flange.	100
M3-17	26902 Sh. 2	3RCS*MV8001C(5)	None	Relief is from using valve 3RCS*V981 to pressurize downstream pipe and flange.	100
M3-18	26902 Sh. 2	3RCS*MV8001C(5)	None	Relief is from using valve 3RCS*V982 to pressurize downstream pipe and flange.	100
M3-19	26902 Sh. 4	3RCS*MV8002B(5)	None	Relief is from using valve 3RCS*V984 to pressurize downstream pipe and flange.	100
M3-20	26902 Sh. 4	3RCS*MV8002B(5)	None	Relief is from using valve 3RCS*V985 to pressurize downstream pipe and flange.	100
M3-21	26902 Sh. 4	3RCS*MV8001B(5)	None	Relief is from using valve 3RCS*V986 to pressurize downstream pipe and flange.	100
M3-22	26902 Sh. 4	3RCS*MV8001B(5)	None	Relief is from using valve 3RCS*V987 to pressurize downstream pipe and flange.	100
M3-23	26902 Sh. 5	3RCS*MV8002D(5)	None	Relief is from using valve 3RCS*V974 to pressurize downstream pipe and flange.	100

TABLE 1 – COMPONENT GROUP 1 PIPING DETAILS (Continued)

Segment Number (1)	Drawing	Line Number (2)	Other ISI Examinations	Request (3)	Dose (4) Savings Estimate (MR)
M3-24	26902 Sh. 5	3RCS*MV8002D(5)	None	Relief is from using valve 3RCS*V975 to pressurize downstream pipe and flange.	100
M3-25	26902 Sh. 5	3RCS*MV8001D(5)	None	Relief is from using valve 3RCS*V976 to pressurize downstream pipe and flange.	100
M3-26	26902 Sh. 5	3RCS*MV8001D(5)	None	Relief is from using valve 3RCS*V977 to pressurize downstream pipe and flange.	100
M3-27	26902 Sh. 6	3RCS-001-226-1	None	Relief is from using valve 3RCS*V958 to pressurize downstream pipe and flange.	100
M3-28	26902 Sh. 1	3RCS-001-225-1	None	Relief is from using valve 3RCS*V956 to pressurize downstream pipe and flange.	2
M3-29	26902 Sh. 1	3RCS-002-23-1 3RCS-750-116-02	None	Relief is from using valve 3RCS*V33 to pressurize downstream pipe and flange.	50

NOTES
1. Schedule 160 piping is used for all segments of Group 1, unless annotated otherwise by Note 5. Material of piping segments is Austenitic stainless steel, SA376, Type 316.
2. Design Pressure is 2485 psig; Normal Operating Pressure: None, and remains normally isolated.
3. Proposed Test Pressure: None.
4. The estimated accumulated dose savings for the use of alternative requirements in the component groups from Request IR-3-09 is a total of 2.5 man-Rem at MPS3.
5. Affected segment material is SA312, F304. This is a part of valve assembly.

TABLE 2 – COMPONENT GROUP 2 PIPING DETAILS					
Segment Number	**Drawing**	**Line Number** (1), (2)	**Other ISI Examinations**	**Request** (3)	**Dose** (4) **Savings Estimate (MR)**
M3-30	26902 Sh. 1 26912 Sh. 2	3-SIL-006-139-1 3-SIL-010-45-1 (5)	None	Request IAW with Code Case N-731	50
M3-31	26902 Sh. 2 26912 Sh. 2	3-SIL-006-145-1 3-SIL-010-49-1 (5)	Weld examinations of welds SIL-6-5-SW-E, SIL-6-6-SW-B, SIL-6-FW-8, and SIL-6-FW-9	Request IAW with Code Case N-731	50
M3-32	26902 Sh. 4 26912 Sh. 2	3-SIL-006-140-1 3-SIL-010-47-1 (5)	None	Request IAW with Code Case N-731	50
M3-33	26902 Sh. 5 26912 Sh. 2	3-SIL-006-146-1 3-SIL-010-51-1 (5)	Weld examinations of welds SIL-7-5-SW-B, SW-E, SW-F, SW-G, SIL-7-FW-7 and FW-8	Request IAW with Code Case N-731	50

NOTES:
1. 6" – Schedule 160 piping is used for segments of Group 2, unless annotated otherwise by Note 5 (10" – Schedule 140). Material of piping segments is Austenitic stainless steel, SA376, Type 316.
2. Design pressure is 2485 psig; Nominal Operating Pressure is 650 psig.
3. Proposed Minimum Test Pressure: 636 psig.
4. The estimated accumulated dose savings for the use of alternative requirements in the component groups from Request IR-3-09 is a total of 2.5 man-Rem at MPS3.
5. 10" – Schedule 140 piping.

TABLE 3 – COMPONENT GROUP 3 PIPING DETAILS					
Segment Number	**Drawing**	**Line Number** (1), (2)	**Other ISI Examinations**	**Request** (3)	**Dose** (4) **Savings Estimate (MR)**
M3-34	26902 Sh. 1 26913 Sh. 2	3-SIH-002-145-1 3-SIH-006-59-1	Welds 407254-FW-49, FW-50, FW-63-1, and FW-85	Between check valves – relief from installing and removing temporary jumper hoses from downstream of check valve 3RCS*V26 to pressurize upstream piping	75
M3-35	26902 Sh. 2 26913 Sh. 2	3-SIH-002-146-1 3-SIH-006-62-1	None	Between check valves – relief from installing and removing temporary jumper hoses from downstream of check valve 3RCS*V102 to pressurize upstream piping	75
M3-36	26902 Sh. 4 26912 Sh. 1	3-SIL-002-20-1 3-SIL-006-21-1 3-SIL-006-161-1 3-SIL-008-155-1	None	Between check valves – relief from installing and removing temporary jumper hoses from downstream of check valve 3RCS*V69 to pressurize upstream piping	75
M3-37	26902 Sh. 5 26912 Sh. 1	3-SIL-002-24-1 3-SIL-006-25-1 3-SIL-006-162-1 3-SIL-008-156-1	None	Between check valves – relief from installing and removing temporary jumper hoses from downstream of check valve 3RCS*V142 to pressurize upstream piping	75

TABLE 3 – COMPONENT GROUP 3 PIPING DETAILS (Continued)					
Segment Number	**Drawing**	**Line Number (1), (2)**	**Other ISI Examinations**	**Request (3)**	**Dose (4) Savings Estimate (MR)**
M3-38	26902 Sh. 1 26902 Sh. 2 26902 Sh. 4 26902 Sh. 5 26913 Sh. 1	3-SIH-150-141-1 3-SIH-150-142-1 3-SIH-150-143-1 3-SIH-150-144-1 3-SIH-150-29-1 3-SIH-150-30-1 3-SIH-150-31-1 3-SIH-003-26-1 3-SIH-003-114-1 3-SIH-150-28-1	Welds 407023-FW-2, FW-3, FW-4, 408046-FW-3 and FW-4	Between check valves – relief from installing and removing temporary jumper hoses from downstream of check valve 3RCS*V029, V106, V70 or V145 to pressurize upstream piping	75

NOTES:

1. Schedule 160 piping is used for segments of Group 3. Material of piping segments is Austenitic stainless steel, SA376, Type 316.
2.

Segment:	<u>34 / 35</u>	<u>36/37</u>	<u>38</u>
Design Pressure:	2485 psig	2485 psig	2735 psig
Maximum Operating:	2235 psig	1747 psig	2725 psig

3. Proposed Test Pressure will be associated with full flow check valve test with the RCS depressurized. There is no pressure instrumentation monitoring these segments. The actual pressure is that achieved during full flow testing using the Safety Injection and Charging pumps.
4. The estimated accumulated dose savings for the use of alternative requirements in the component groups from Request IR-3-09 is a total of 2.5 man-Rem at MPS3.

TABLE 4 – COMPONENT GROUP 4 PIPING DETAILS					
Segment Number	**Drawing**	**Line Number [1], [2]**	**Other ISI Examinations**	**Request [3]**	**Dose [4] Savings Estimate (MR)**
M3-39	26912 Sh. 1	3-RHS-012-33-1	Welds RHS-501-3-SW-5, RHS-501-FW-3 and FW-5	Relief is from using valve 3RHS*V999 to pressurize downstream pipe and valve.	None
M3-40	26912 Sh. 1	3-RHS-012-35-1	None	Relief is from using valve 3RHS*V998 to pressurize downstream pipe and valve.	None

NOTES:
1. 12" – Schedule 160 piping is used for segments of Group 4. Material is Austenitic stainless steel, SA376, Type 316.
2. Design Pressure is 2485 psig; Maximum Operating Pressure is 441psig.
3. Proposed Minimum Test Pressure: 340 psia

TABLE 5 – COMPONENT GROUP 5 PIPING DETAILS					
Segment Number	**Drawing**	**Line Number (1), (2)**	**Other ISI Examinations**	**Request (3)**	**Dose (4) Savings Estimate (MR)**
M3-41	26902 Sh 1 26902 Sh 3	3-RCS-002-150-1	None	Relief is from using valve 3RCS*V174 (AV8145) to pressurize upstream piping and valve.	None

NOTES:

1. 2" – Schedule 160 piping is used for segments of Group 5. Material is Austenitic stainless steel, SA376, Type 316.
2. Design Pressure is 2485 psig; Minimum Operating Pressure is 325psia. during normal plant cooldown.
3. Proposed Minimum Test Pressure: 325psia
4. The estimated accumulated dose saving for the use of alternative requirements in the component groups from Request IR-3-09 is a total of 2.5man-Rem at MPS3.

ASME CODE CASE N-731*, ALTERNATIVE CLASS 1 SYSTEM LEAKAGE TEST PRESSURE REQUIREMENTS
SECTION XI, DIVISION 1*
(1 PAGE)

DOMINION
MILLSTONE POWER STATION UNIT 3

Approval Date: February 22, 2005

The ASME Boiler and Pressure Vessel Standards Committee took action to eliminate Code Case expiration dates effective March 11, 2005. This means that all Code Cases listed in this Supplement and beyond will remain available for use until annulled by the ASME Boiler and Pressure Vessel Standards Committee.

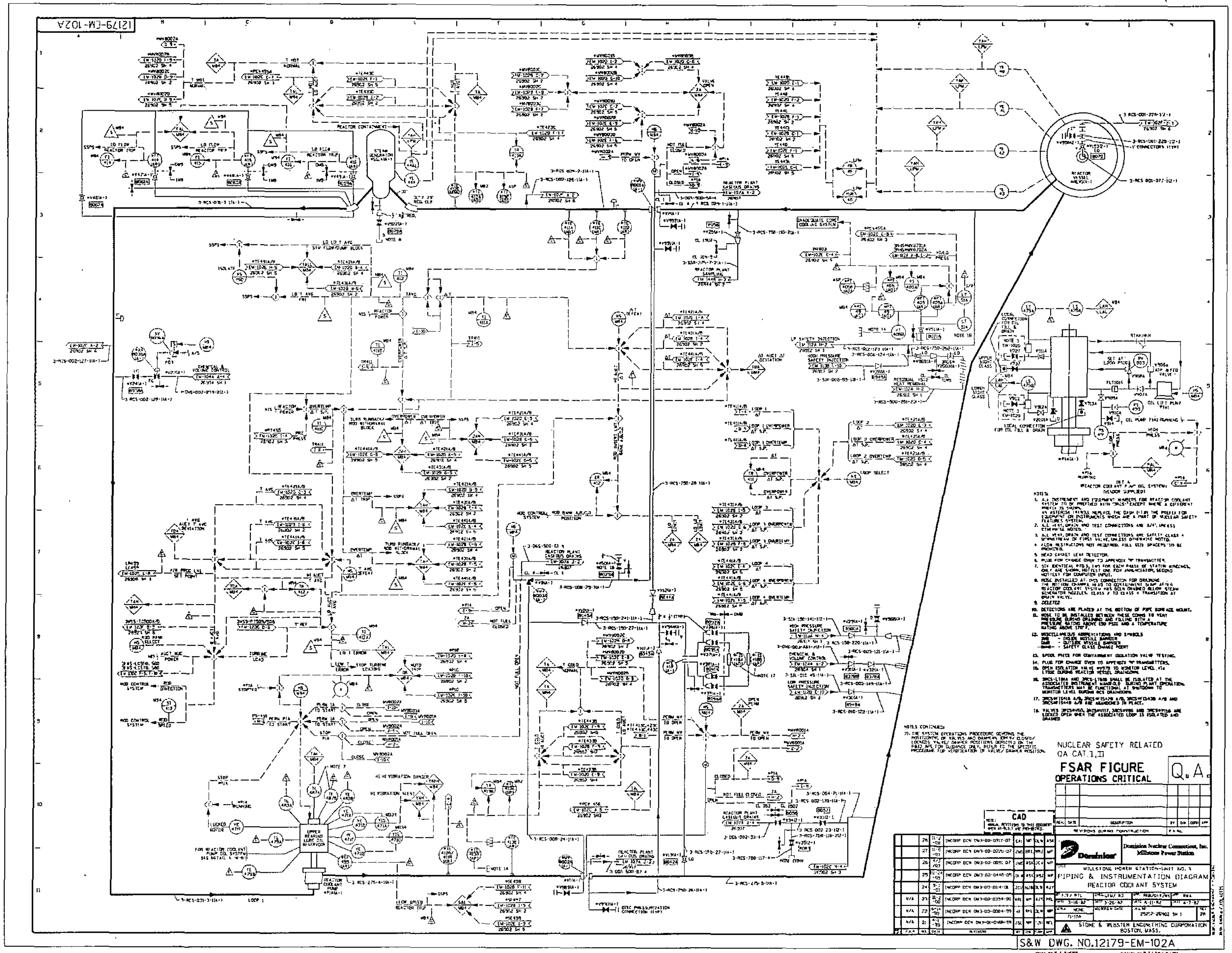
Case N-731
Alternative Class 1 System Leakage Test Pressure Requirements
Section XI, Division 1

Inquiry: What alternative Class 1 system leakage test pressure requirements may be used for portions of Class 1 systems that are continuously pressurized during an operating cycle by a statically-pressurized passive safety injection system of a pressurized water reactor, in lieu of the requirements of IWB-5221(a)?

Reply: It is the opinion of the Committee that, for portions of Class 1 safety injection systems that are continuously pressurized during an operating cycle, the pressure associated with a statically-pressurized passive safety injection system of a pressurized water reactor may be used.

USE OF ALTERNATIVE CLASS 1 PRESSURE TEST REQUIREMENTS REQUEST IR-3-09

PIPING AND INSTRUMENTATION DIAGRAMS



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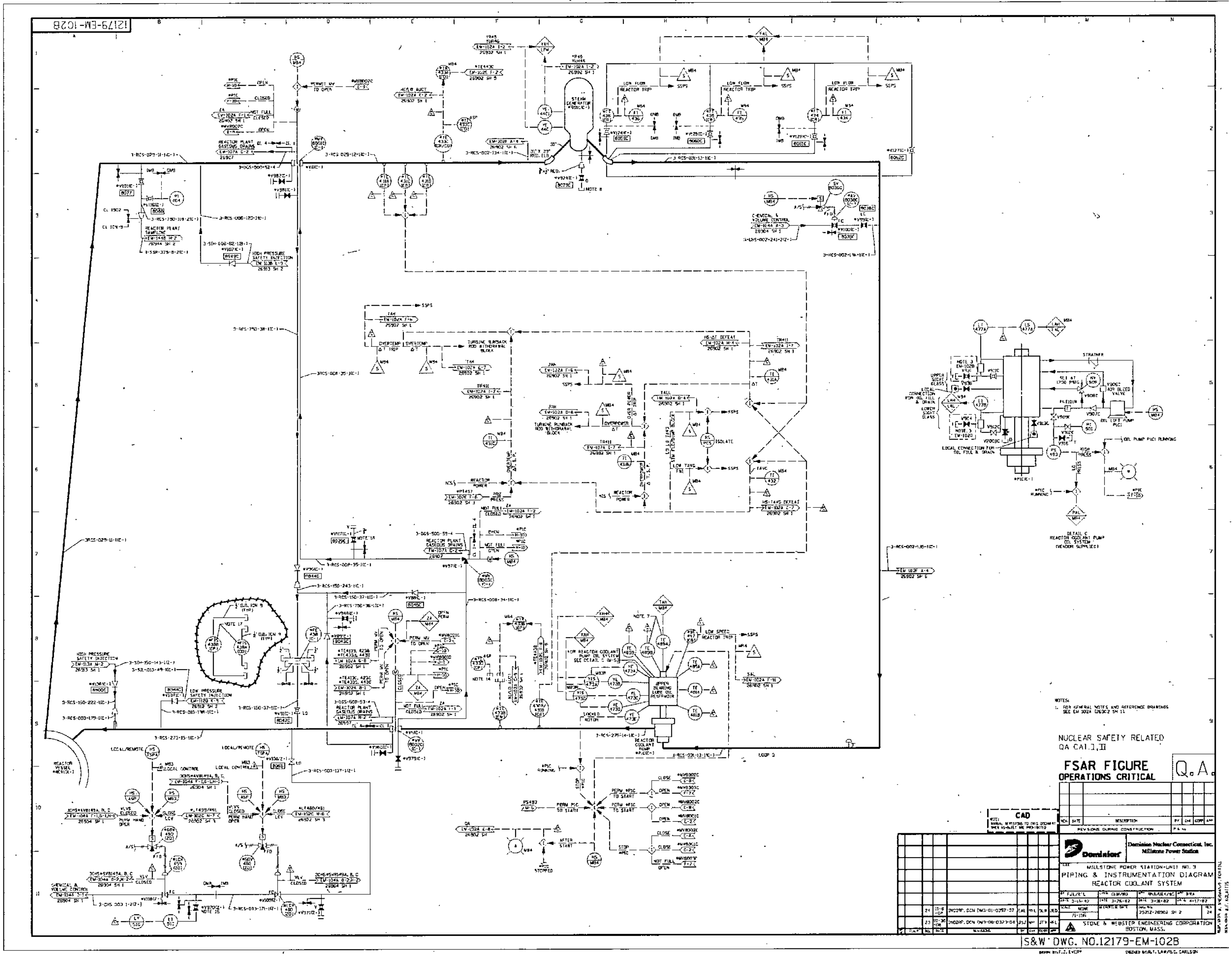
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.
S&W DWG. NO.12179-EM-102A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Millstone Power Station
MILLSTONE POWER STATION-UNIT NO. 3
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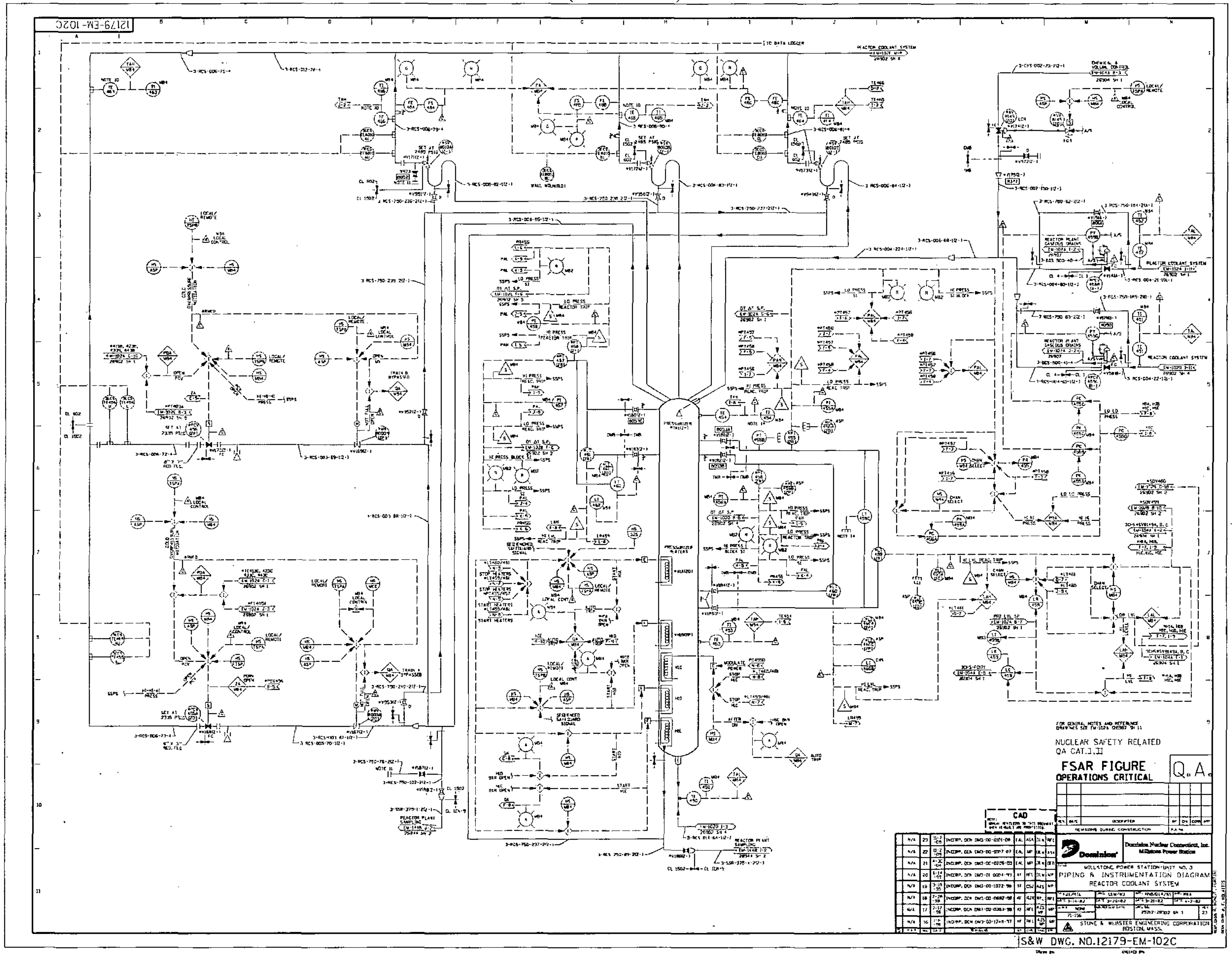
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BOSTON, MASS.
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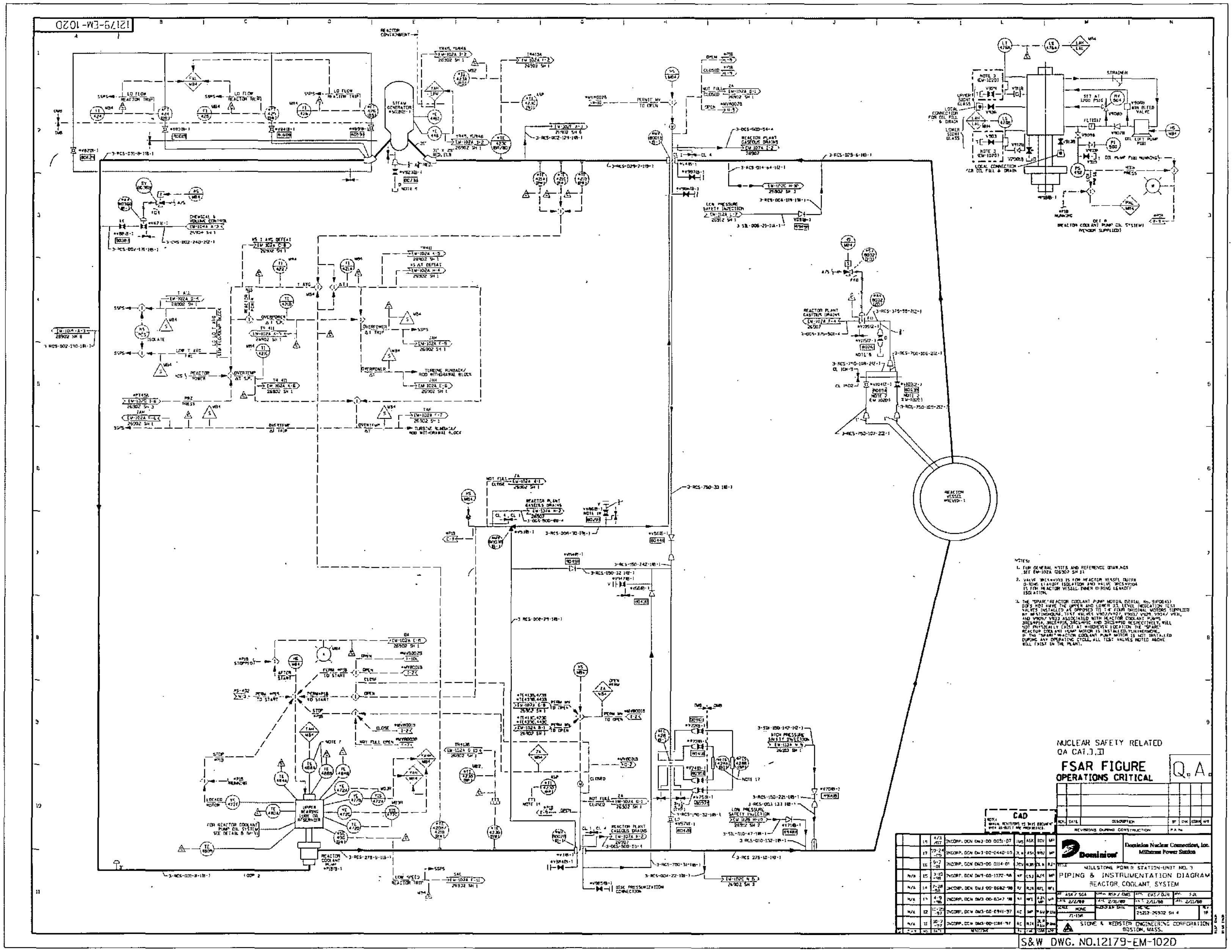

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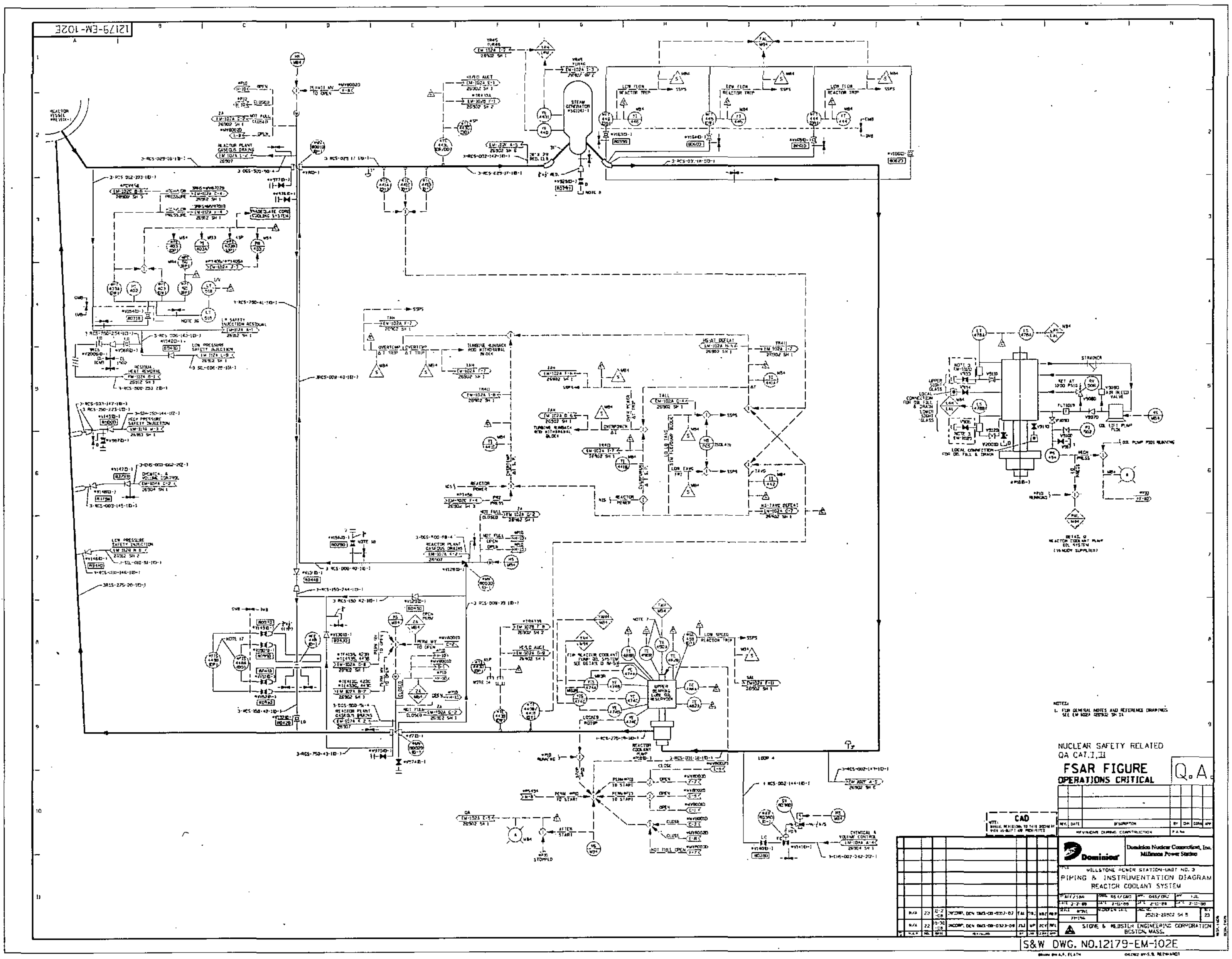

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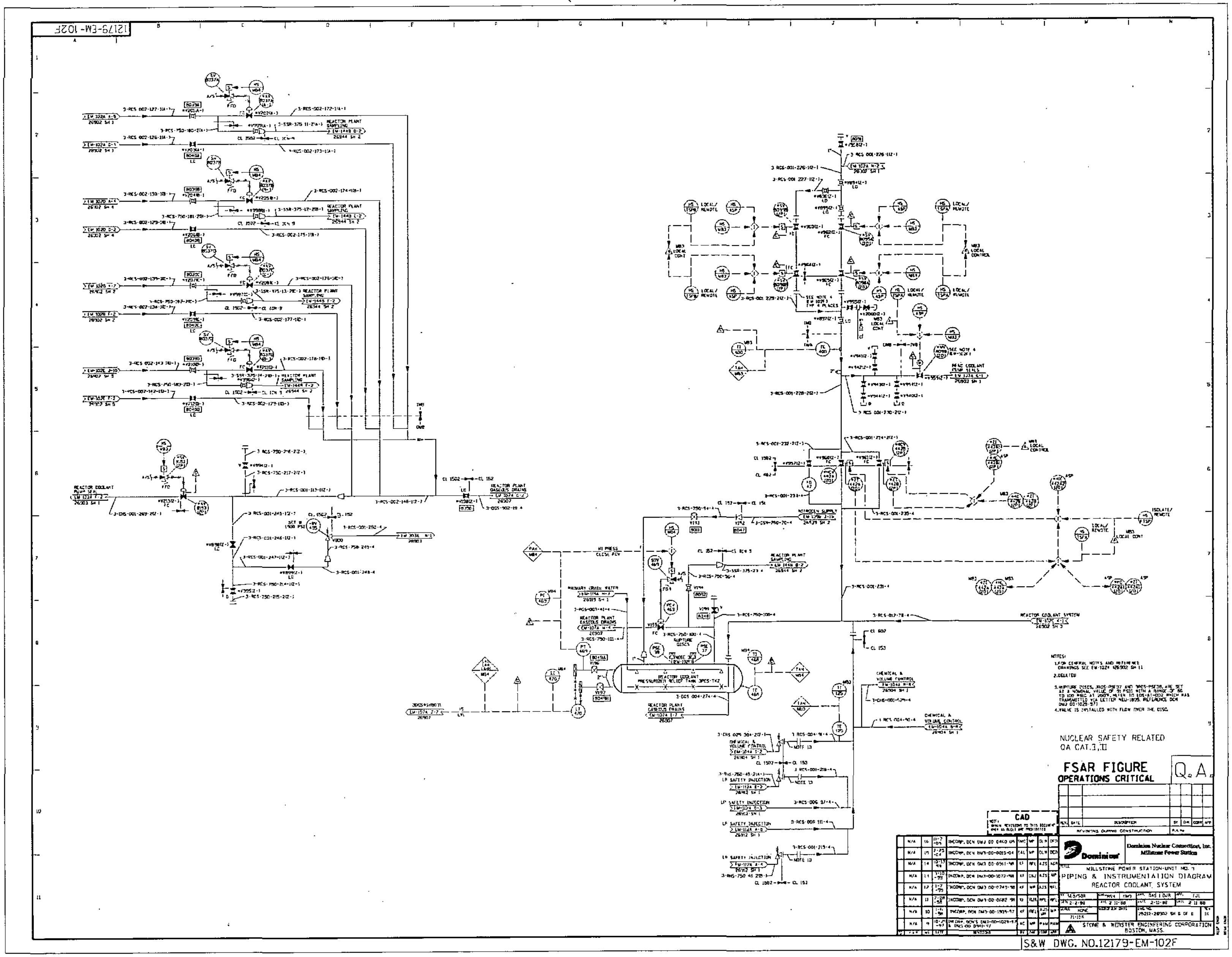
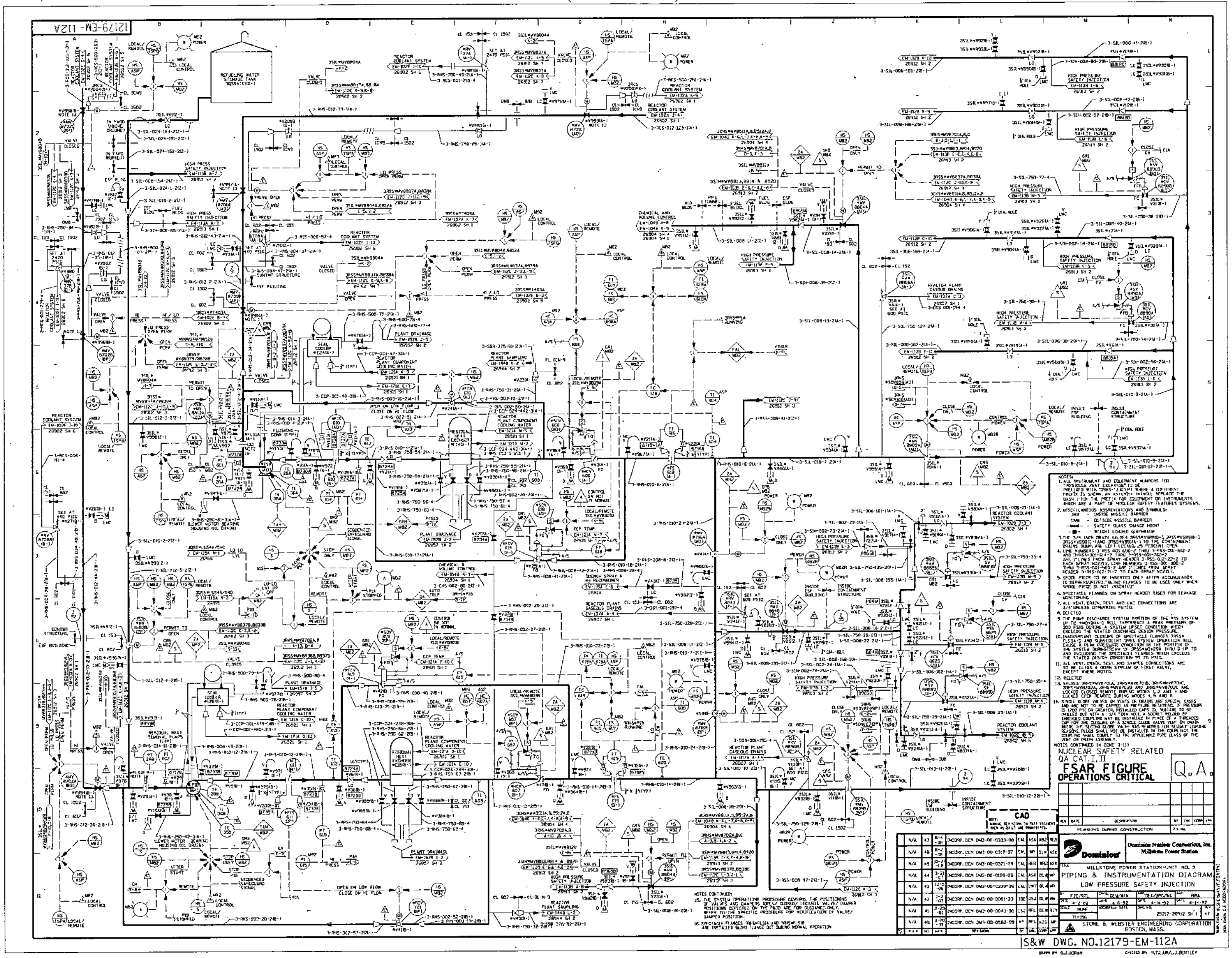
10 CFR 50.55a Request Number IR-3-09
Attachment 3
(Continued)





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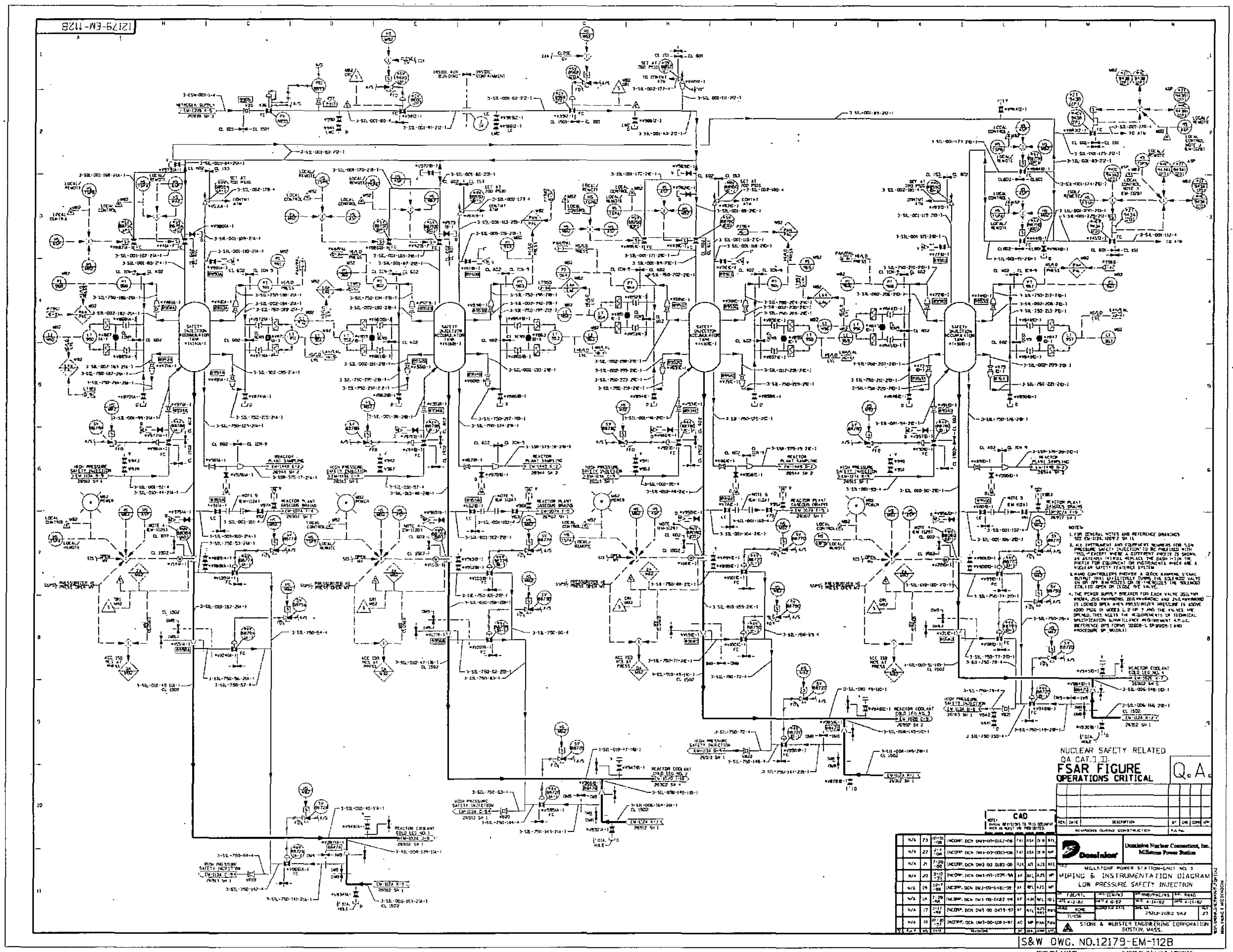
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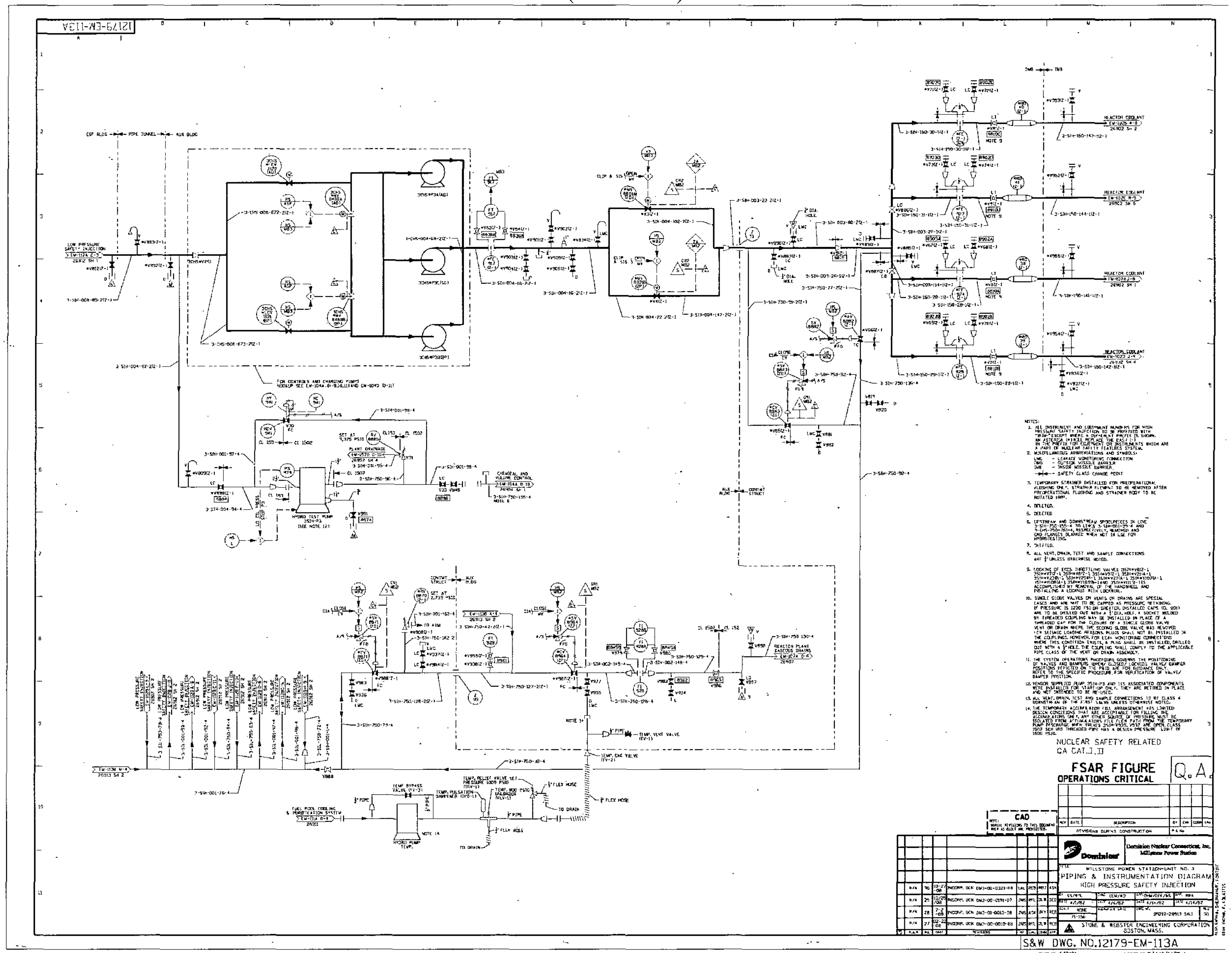
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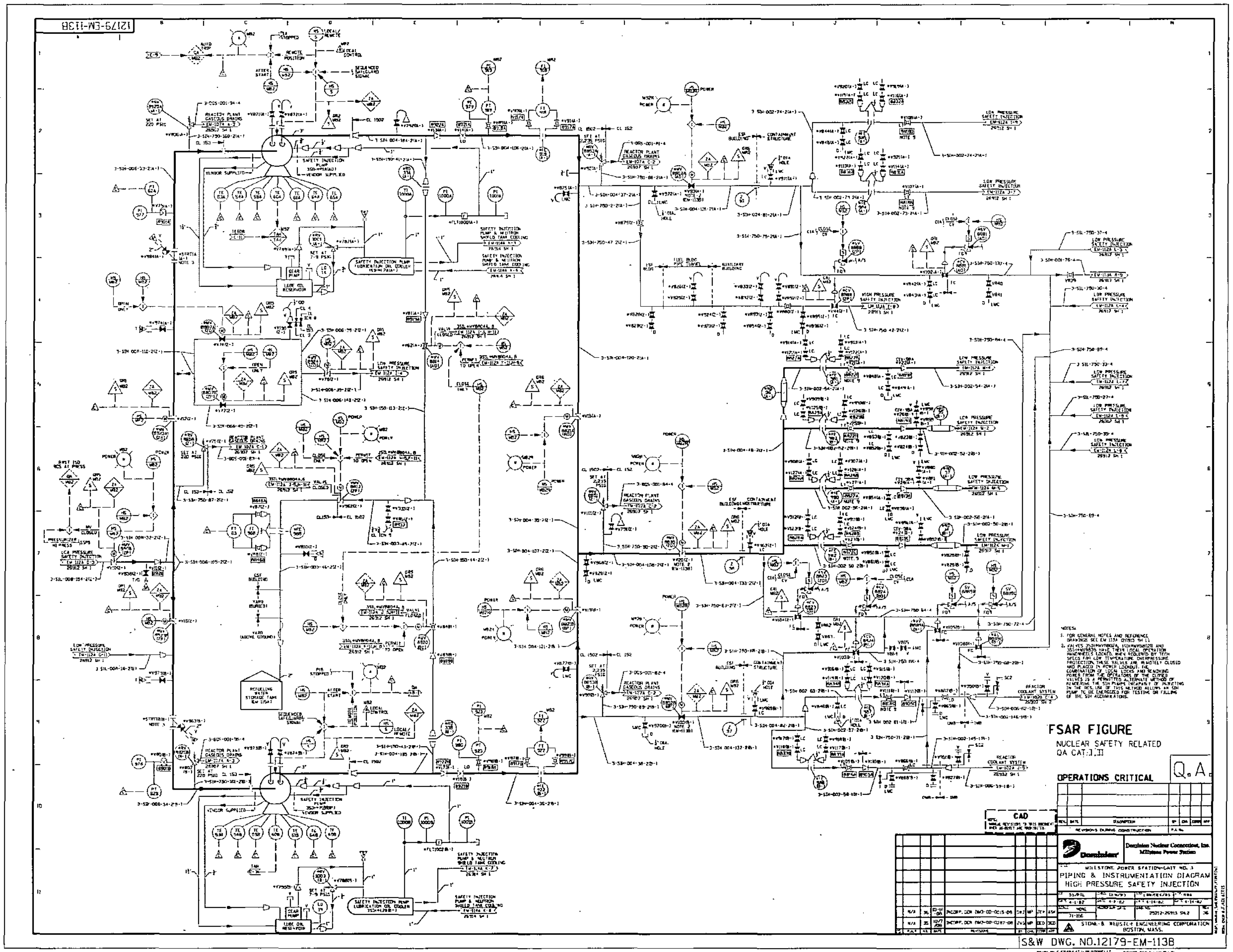
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10 CFR 50.55a Request Number IR-3-10

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)

- Alternative Provides Acceptable Level Of Quality And Safety –

1. ASME Code Components Affected

ASME Code Class:	Code Class 1
References:	ASME Section XI, IWA-5241 and Table IWB-2500-1 10 CFR 50.55a(g)(6)(ii)(E), Code Case N-722
Examination Category:	B-P
Item Number:	B15.10
Description:	Alternative Examination Criteria for the Visual Examination of Reactor Coolant System Hot Leg and Cold Leg Nozzle-to-Safe End Welds
Components:	Reactor Pressure Vessel (RPV) Nozzle-to-Safe End Welds: <u>Inlet Nozzles:</u> 301-121-A 301-121-B 301-121-C 301-121-D <u>Outlet Nozzles:</u> 302-121-A 302-121-B 302-121-C 302-121-D

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

Examination Category B-P, "All Pressure Retaining Components," requires that Visual, VT-2 examinations are performed each refueling outage. IWA-5241(b) allows this examination to be performed without insulation removal, stating, "only the examination of the surrounding area (including floor areas or equipment surfaces located underneath the components) for evidence of leakage shall be required."

10 CFR 50.55a(g)(6)(ii)(E)(1), states (in part) that "all licensees of pressurized water reactors shall augment their inservice inspection program by implementing ASME Code Case N–722, Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials Section XI, Division 1," dated: July 5, 2005, Attachment 1.

ASME Code Case N-722, requires a Visual, VE "Bare Metal Visual" of all listed locations (See Attachment 1, Code Case N-722), which includes RPV outlet (hot leg) and inlet (cold leg) nozzle welds (Item Nos. B15.90 and B15.95, respectively).

4. <u>Reason for the Request</u>

The ASME Boiler and Pressure Vessel Code, Section XI, 2004 Edition, No Addenda, [Reference 8.1] is the Code Edition to be used for the Third Inservice Inspection Interval at MPS3, which starts on April 23, 2009, and is scheduled to end on April 22 2019. The requirements for Class 1 Visual, VT-2 examinations for leakage of pressure retaining components are included in this Code Edition under Examination Category B-P, "All Pressure Retaining Components." Visual, VT-2 examinations are performed each refueling outage. For insulated components, IWA-5241(b) allows this examination to be performed without insulation removal, stating, "only the examination of the surrounding area (including floor areas or equipment surfaces located underneath the components) for evidence of leakage shall be required." Based on these requirements, visual examinations for leakage may be performed on Class 1 components with insulation in place.

However, both the industry as represented in this case by the Materials Reliability Program (MRP) and the NRC staff along with ASME have concluded that a visual examination for leakage performed on insulated components is inadequate for the identification of leakage that can potentially occur as a result of primary water stress corrosion cracking (PWSCC) in items made with Alloy 600/82/182 materials. This alternative request is needed to address this inadequacy.

The NRC staff provided their position on these visual examination requirements in the 10 CFR 50.55a rulemaking issued September 10, 2008 (effective date October 10, 2008) under 73 FR 52748. It included the mandatory use of ASME Code Case N-722 Attachment 1 with conditions specified in the 10 CFR 50.55a(g)(6)(ii)(E), "Reactor Coolant Pressure Boundary Visual Inspections".

Meeting these requirements is a concern because the reactor pressure vessel (RPV) nozzles at MPS3 have an insulation package surrounding each nozzle and its corresponding nozzle-to-safe end Alloy 82/182 welds which makes them inaccessible for these required bare metal visual examinations.

Prior to the fall 2008 MPS3 refueling outage, DNC submitted a letter to the NRC[1] notifying the staff that DNC was implementing a deviation from the requirements of MRP-139 [Reference 8.2]. This deviation was to not perform the required bare metal visual

[1] DNC Letter to NRC, "Dominion Nuclear Connecticut, Inc. Millstone Power Station Unit 3 Electric Power Research Institute MRP-139 Deviation Notification," dated October 27, 2008, ADAMS Accession No. ML083010233

examinations specified in MRP-139 based on the restricted access to the MPS3 RPV nozzle welds caused by the insulation package surrounding each nozzle. Attachment 2 contains the Technical Evaluation M3-EV-08-0016 that provided the basis for not performing these bare metal visual examinations. The restrictions from performing the bare metal visual examinations of MRP-139 are the same as the restrictions that this alternative request has been written to address now that the requirements of Code Case N-722 [Reference 8.3] apply.

This alternative would be used in lieu of the requirements of Code case N-722.

5. <u>Proposed Alternative and Basis for Use</u>

For purposes of this request, the following Table is provided to show the examinations that will be performed under this requested alternative. These examinations are exactly what were derived from the flaw tolerance evaluation contained in Attachment 2.

These modifications to the requirements of Code Case N-722 Attachment 1 are shown in Table 1, below with the modifications bolded and underlined for ease of identification.

Table 1: MPS3 Class 1 PWR Components Alloy 600/82/182

To Be Examined In Accordance with Code Case N-722 Attachment 1 with Bolded and Underlined Modifications Supported By Attachment 2 of this Request

Item No.	Parts Examined	Examination Requirements	Examination Method	Acceptance Standards	First Inspection Interval	Successive Inspection Intervals	Deferral of Inspection To end of Interval
B15.90	Hot leg nozzle-to-pipe connections	All 4 Hot leg nozzle-to safe end welds	**<u>Volumetric</u>**[(a,b)]	**<u>IR-3-10</u>** **<u>Para. 5.1</u>**	**<u>Every other refueling outage</u>**[(c)]	Same as for 1st interval	Not permissible
B15.95	Cold leg Nozzle-to pipe connections	All 4 Cold leg nozzle-to safe end welds	**<u>Volumetric</u>**[(a,b)]	**<u>IR-3-10</u>** **<u>Para. 5.1</u>**	**<u>Every 3rd refueling outage</u>**[(d)]	Same as for 1st interval	Not permissible

Notes related to examination of hot leg nozzle to pipe connection (B15.90) and cold leg nozzle to pipe connection (B15.95):

(a) UT will be performed from the inside diameter of these welds in lieu of the Visual, VE.

(b) All UT examinations will meet the appropriate supplement of Section XI, Appendix VIII of the ASME Boiler and Pressure Vessel Code. The required weld volume shall be as shown on Fig. IWB-2500-8(c) of ASME Section XI, 2004 Edition (No Addenda), [Reference 8.1].

(c) UT will be performed every other refueling outage. These welds were last examined in the spring of 2007 (3R11) outage and will be due in the spring 2010 (3R13) outage based on the analysis in Attachment 2, which supports UT approximately every 36 months.

(d) UT will be performed every 3rd refueling outage. They were last examined in the spring of 2007 (3R11) and will be due in the fall 2011 (3R14) outage based on the analysis in Attachment 2, which supports UT approximately every 54 months.

5.1 Acceptance Standards

5.1.1 Evaluation of Examination Results

5.1.1.1 General

(a) The volumetric examinations performed in accordance with IWA-2200 shall be evaluated by comparing the examination results with the acceptance standards in 5.1.2.

(b) Volumetric examination results shall be compared with recorded results of the preservice examination and prior inservice examinations. Acceptance of welds for continued service shall be in accordance with 5.1.2.

5.1.2 Acceptance

5.1.2.1 Acceptance by Volumetric Examination

(a) A weld whose volumetric examination confirms the absence of flaws shall be acceptable for continued service.

(b) A weld with planar surface flaws in the butt weld or base metal inside surface shall be accepted for continued service in accordance with the provisions of 5.1.2.2 or 5.1.2.3. Other flaws shall meet the acceptance standards of IWB-3514 or be accepted for continued service in accordance with 5.1.2.2 or 5.1.2.3.

5.1.2.2 Acceptance by Repair/Replacement Activity or Corrective Measures

(a) A weld whose volumetric examination reveals a flaw not acceptable for continued service in accordance with the provisions of 5.1.2.3 is unacceptable for continued service until the additional examinations of 5.2 are satisfied and the weld is corrected by repair/replacement activity in accordance with IWA-4000 or by corrective measures beyond the scope of this relief request (e.g. stress improvement).

5.1.2.3 Acceptance by Evaluation

(a) A weld whose volumetric examination detects planar surface flaws in the butt weld or base metal inside surface, or other flaws (5.1.2.1(b)) in the required examination volume that exceed the acceptance standards of IWB-3514, is acceptable for continued service if an analytical evaluation meets the requirements of IWB-3600 and the additional examinations of 5.2 are performed in the current outage.

(b) Any weld containing a planar surface flaw in the butt weld/base metal inside surface will be reexamined at an every refueling outage frequency, unless mitigated by an approved mitigation technique.

5.2 Additional Examinations

5.2.1 Examinations which reveal unacceptable flaws as defined in 5.2.1(a) and (b), below shall be extended to include examinations of additional welds during the current outage. The use of IWB-3514 is for the purpose of determination of scope expansion and not for the purposes of determining acceptability of the flaws. Acceptability of flaws is determined in accordance with 5.1.

(a) Planar surface flaws in the butt weld or base metal inside surface exceeding the surface flaw sizes of IWB-3514 are revealed.

(b) Examination volumes that reveal axial crack growth beyond the specified examination volume.

5.2.2 The number of additional weld examinations shall be equal to the number of welds for that Inspection Item of Table 2 originally scheduled to be performed during the present inspection period. The additional examinations shall be selected from the same Inspection Item and where applicable, from welds of similar materials, construction, and the same or higher operating temperatures. However, if the original examination was for Inspection Item B15.95 of Table 1, the additional examinations shall include first, additional welds from Inspection Item B15.90, if any remain, and second, additional weld(s) from Inspection Item B15.95 to reach the required number of additional examinations.

5.2.3 If the additional examinations required by 5.2.1 reveal flaws exceeding the requirements of 5.2.1(a), or (b) the examinations shall be further extended to include additional examinations during the current outage. These additional examinations shall include the remaining number of welds for that Inspection Item in Table 2, at the same or higher operating temperature conditions. In addition a 25% sample of welds of that Inspection Item at lower operating temperatures shall be sampled. If the examinations of this sample of welds at lower operating temperature reveal flaws exceeding the requirements of 5.2.1(a), or (b), the examinations shall be further extended to include all welds of that Inspection Item, regardless of operating temperature, within the scope of this relief request.

6. Duration of the Proposed Alternative

This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019, and will be used as a basis to continue scheduling the sequence examinations into the next inspection interval or until the items associated with this request are either replaced, repaired, or mitigated.

7. Precedents

Because of the unique insulation package that surrounds the MPS3 RPV nozzles, there are no precedents for this specific type of request.

8. References

8.1 ASME Boiler and Pressure Vessel Code, Section XI, 2004 Edition, No Addenda

8.2 Material Reliability Program, "Primary System Piping Butt Weld Inspection and Evaluation Guideline (MRP 139)", TR-1010087, EPRI, Palo Alto, CA, dated: August 2005

8.3 ASME Code Case N-722, "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated with Alloy 600/82/182 Materials, Section XI, Division 1", dated: July 5, 2005

ASME CODE CASE N-722, ADDITIONAL EXAMINATIONS FOR PWR PRESSURE RETAINING WELDS IN CLASS 1 COMPONENTS FABRICATED WITH ALLOY 600/82/182 MATERIALS SECTION XI, DIVISION 1

DATED: JULY 5, 2005

Approval Date: July 5, 2005

The ASME Boiler and Pressure Vessel Standards Committee took action to eliminate Code Case expiration dates effective March 11, 2005. This means that all Code Cases listed in this Supplement and beyond will remain available for use until annulled by the ASME Boiler and Pressure Vessel Standards Committee.

Case N-722
Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials
Section XI, Division 1

Inquiry: What examinations, in addition to those of Table IWB-2500-1, may be performed to provide additional detection capability for pressure boundary leakage in pressurized water reactor plants having pressure retaining partial or full penetration welds in Class 1 components fabricated with Alloy 600/82/182 material?

Reply: It is the opinion of the Committee that in addition to the examination requirements of Table IWB-2500-1 the additional examinations of Table 1 shall be performed for pressurized water reactor plants having partial or full penetration welds in Class 1 components fabricated with Alloy 600/82/182 material.

TABLE 1
EXAMINATION CATEGORIES

CLASS 1 PWR COMPONENTS CONTAINING ALLOY 600/82/182[1]

Item No.	Parts Examined[2]	Examination Requirements	Examination Method[3, 4, 5]	Acceptance Standard	Extent and Frequency of Examination: First Inspection Interval	Extent and Frequency of Examination: Successive Inspection Intervals	Deferral of Inspection to End of Interval
Reactor Vessel[2]							
B15.80	RPV bottom-mounted instrument penetrations	All penetrations	Visual, VE	IWB-3522	Every other refueling outage	Same as for 1st interval	Not permissible
B15.90	Hot leg nozzle-to-pipe connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.95	Cold leg nozzle-to-pipe connections	All connections	Visual, VE	IWB-3522	Once per interval[6, 7]	Same as for 1st interval	Not permissible
B15.100	Instrument connections	All connections	Visual, VE	IWB-3522	Once per interval[6, 7]	Same as for 1st interval	Not permissible
Steam Generators							
B15.110	Hot leg nozzle-to-pipe connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.115	Cold leg nozzle-to-pipe connections	All connections	Visual, VE	IWB-3522	Once per interval[6, 7]	Same as for 1st interval	Not permissible
B15.120	Bottom channel head drain tube penetration	All penetrations	Visual, VE	IWB-3522	Once per interval[6, 7]	Same as for 1st interval	Not permissible
B15.130	Primary side hot leg instrument connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.135	Primary side cold leg instrument connections	All connections	Visual, VE	IWB-3522	Once per interval[6, 7]	Same as for 1st interval	Not permissible
Pressurizer							
B15.140	Heater penetrations	All penetrations	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.150	Spray nozzle-to-pipe connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.160	Safety and relief nozzle-to-pipe connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.170	Surge nozzle-to-pipe connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.180	Instrument connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.190	Drain nozzle-to-pipe connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
Piping							
B15.200	Hot leg instrument connections	All connections	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.205	Cold leg instrument connections	All connections	Visual, VE	IWB-3522	Once per interval[6, 7]	Same as for 1st interval	Not permissible
B15.210	Hot leg full penetration welds	All welds	Visual, VE	IWB-3522	Each refueling outage	Same as for 1st interval	Not permissible
B15.215	Cold leg full penetration welds	All welds	Visual, VE	IWB-3522	Once per interval[6, 7]	Same as for 1st interval	Not permissible

TABLE 1
EXAMINATION CATEGORIES (CONT'D)

NOTES:

(1) Alloy 600/82/182 are equivalent to UNS N06600 (SB-163, SB-166, SB-167, SB-168 and SB-564), UNS N06082 (SFA 5.14 ERNiCr-3) and UNS W86182 (SFA 5.11 ENiCrFe-3).

(2) The reactor vessel closure head is not addressed in this Case.

(3) The Visual Examination (VE) performed on Alloy 600/82/182 components for evidence of pressure boundary leakage and corrosion on adjacent ferritic steel components shall consist of the following:

(a) A direct VE of the bare-metal surface performed with the insulation removed. Alternatively, the VE may be performed with insulation in place using remote visual inspection equipment that provides resolution of the component metal surface equivalent to a bare-metal direct VE.

(b) The VE may be performed when the system or component is depressurized.

(c) The direct VE shall be performed at a distance not greater than 4 ft (1.2 m) from the component and with a demonstrated illumination level sufficient to allow resolution of lower case characters having a height of not greater than 0.105 in (2.7 mm).

(4) Personnel performing the VE shall be qualified as VT-2 visual examiners and shall have completed a minimum of four (4) hours of additional training in detection of borated water leakage from Alloy 600/82/182 components and the resulting boric acid corrosion of adjacent ferritic steel components.

(5) An ultrasonic examination, performed from the component inside or outside surface in accordance with the requirements of Table IWB-2500-1 and Appendix VIII (1995 Edition with the 1996 Addenda or later) shall be acceptable in lieu of the VE requirement of this table.

(6) VE shall be performed in accordance with the schedule in IWB-2400.

(7) The detection of evidence of pressure leakage at a VE location shall require the VE of all components within the Examination Item No. prior to reactor startup. These additional VEs shall not affect the original VE schedule of the components within the Examination Item No.

Dominion Nuclear Connecticut, Inc Millstone Power Station Unit 3 Electric Power Research Institute MRP-139 Notification and Technical Evaluation for Technical Justification for deviation from Mandatory Requirements of MRP-139 Millstone Unit 3 M3-EV-08-0018 Rev.0 - 9/25/08

MILLSTONE POWER STATION UNIT 3

DOMINION NUCLEAR

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Web Address: www.dom.com

Dominion®

October 27, 2008

Mr. Dennis P. Weakland
Materials Reliability Program - EPRI
c/o Jennifer Ma
Administrative Assistant
ANT, MRP & SGMP
3420 Hillview Avenue
Palo Alto, CA 94304

Memo No. RA-08-026
NLOS/GAW R0

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
MRP-139 DEVIATION NOTIFICATION

In accordance with the Nuclear Energy Institute (NEI) Guideline for the Management of Materials Issues (NEI 03-08, Rev. 1), Dominion Nuclear Connecticut, Inc. (DNC) is providing a report supporting the deviation from the requirements of Electric Power Research Institute (EPRI) Materials Reliability Program (MRP): Primary System Piping Butt Weld Inspection and Evaluation Guidelines (MRP-139) at Millstone Power Station Unit 3 (MPS3).

The deviation report was approved by senior management on September 29, 2008 and is included as an enclosure to this letter. Specifically, the deviation relates to the mandatory visual examination requirements contained in the MRP-139 Table 6-2. It is expected that this deviation will continue while the MRP-139 requirement remains in effect, or until the locations are mitigated to prevent propagation of potential primary water stress corrosion cracking (PWSCC).

If you have any questions regarding this report, please contact Mr. Geoffrey Wertz at (804) 273-3572.

Sincerely,

J. Alan Price
Vice President – Nuclear Engineering

Enclosure: TECHNICAL EVALUATION for Technical Justification for Deviation from Mandatory Requirements of MRP-139, Millstone Unit Three, M3-EV-08-0018 Rev. 0, September 25, 2008.

Memo No. RA-08-026
MRP-139 Deviation Notification
Enclosure

Enclosure

TECHNICAL EVALUATION

for

Technical Justification for Deviation from Mandatory Requirements of

MRP-139

Millstone Unit Three

M3-EV-08-0018

Rev. 0

9/25/08

MILLSTONE POWER STATION UNIT 3
DOMINION NUCLEAR CONNECTICUT, INC.

QA ☒ Non-QA ☐

DB or LB document change required? yes ☐ no ☒

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Total pages	36

1.0 PURPOSE

This technical evaluation (TE) documents the technical justification for Millstone Unit 3 (MPS3) to deviate from certain bare metal visual examination (VE) requirements of MRP-139 [1], the industry-endorsed guideline for management of Alloy 600 issues on piping and nozzle butt welds. The TE is intended for independent materials expert concurrence and transmittal to the Materials Reliability Program (MRP) for notification in accordance with the industry initiative on materials, NEI 03-08 [2].

2.0 BACKGROUND

2.1 Materials Aging Issue

Primary Water Stress Corrosion Cracking (PWSCC) of nickel-based alloys has been an on-going industry issue for several years. The cracking occurs in susceptible materials when subjected to high stress levels in the PWR reactor coolant environment [1]. The susceptible materials include weld filler materials A182/A82, which are utilized at Millstone Unit 3 to weld the stainless steel safe-ends to the reactor vessel nozzles. Both inlet (RCS cold leg) and outlet (RCS hot leg) nozzles are potentially affected by PWSCC at the nozzle to safe end welds. The subject weld joints include A182 buttering on the ferritic vessel nozzle and A182 weld filler between the buttering and the forged stainless steel safe end. References [5] and [6] provide greater detail on these locations.

2.2 Applicable MRP-139 Requirements

The applicable MRP-139 requirements for managing PWSCC at the nozzle welds are presented in the Table 1 on the next page along with the current inspection status, just prior to the 3R12 refueling outage (RFO) in Fall 2008. MPS3 is on an 18 month refueling cycle.

Table 1 - MRP-139 Inspection Requirements

	Hot Leg (Outlet)		Cold Leg (Inlet)	
	MRP Requirements Tbl 6-1 Cat. D and Tbl 6-2 Cat. J	Current Status & Next req'd inspection	MRP Requirements Tbl 6-1 Cat. E and Tbl 6-2 Cat. K	Current Status & Next req'd inspection
Volumetric (UT)	Every 5 yrs	3R11, Spring 07 3R14, Fall 11	Every 6 yrs	3R11, Spring 07 3R15, Spring 13
Bare Metal Visual Examination (VE)	Every RFO except ones with Volumetric	Not inspected 3R12, Fall 08	Within 3 RFO (4.5 yrs) of volumetric exam	Not inspected 3R12, Fall 08

The tabular listing of requirements is simplified but presents MRP-139 schedule requirements accurately. The current inspection status shows that the subject welds were UT inspected from the ID during 3R11 in the spring, 2007. No indications were recorded. At issue is the fact that nozzle inaccessibility prevents bare metal visual examinations as required by MRP-139 Table 6-2 for visual examination categories J and K.

2.3 Millstone 3 Unique Design Features and Nozzle Accessibility

The vessel nozzle accessibility for Millstone 3 is very difficult because of the insulation package design at the nozzles. The insulation package comprises at least 14 heavy blocks weighing from 200 lbs to 1200 lbs each, bolted in place, in a very restricted location under the pit seal of the reactor vessel flange. A sketch of the package is shown in Attachment 2 on page 10. Scaffolding must be erected and each of the blocks needs to be rigged in and out. Removal of these blocks to permit the bare metal visual examination is estimated to require 105 work hours per nozzle, with a dose impact of 3.69 Rem per nozzle. The total dose impact for examination of the eight vessel nozzles is approximately 29.5 Rem.

2.4 Previous Evaluations

Technical Evaluation M3-EV-05-0024 [6] performed a similar evaluation for the initial bare metal visual examination of the nozzles required prior to the issuance of MRP-139. The TE documents an extensive review of original fabrication radiography of the nozzle to safe end welds. The review showed that, "For the nozzle to safe end welds, this review did not show any unusual results. All the welds had some porosity and slag inclusions but they were within acceptable limits. There were not any multiple reader sheets or repair weld numbers indicating weld repairs."

Technical Evaluation M3-EV-07-0026 [5], in addition to mapping out a mitigation plan for A600 locations, documents a complete listing of them along with any repair records available from Westinghouse records. Records showed only minor local repairs were performed.

2.5 References:

1 "Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guidelines (MRP-139)", Technical Report 1010087, EPRI, Palo Alto, CA: 2005. (retrievable from Portal – Virginia)

2 NEI 03-08, "Guideline for the Management of Materials Issues", Nuclear Energy Institute (NEI), Rev. 1 dated April 2007, with Addendum E Rev. 3 dated April 2008

3 CR-08-07092, "Millstone Unit 3 Can Not Do a Mandatory Requirement of MRP-139", initiated 6/18/2008

4 LTR-PAFM-08-127 Rev. 2, "Technical Justification for Deviation from MRP-139 Visual Inspection Schedules for Millstone Unit 3 Reactor Vessel Inlet and Outlet Nozzles", dated July 2008, © 2008, Westinghouse Electric Company LLC (Attachment 3)

5 M3-EV-07-0026 Rev. 0, "Technical Evaluation For The Control And Remediation Plan For Alloy 600 MPS 3", dated 6/22/2007

6 M3-EV-05-0024 Rev. 0, "Justification for the Deferral of Visual Examination of the Millstone Unit 3 Reactor Vessel Nozzle to Safe End Welds", dated 6/28/2007

7 ASME BPV Code Section XI, 1989 Edition, no Addenda

8 ASME BPV Code Section XI, 1998 Edition with 2000 Addenda

3.0 DISCUSSION

In summary of the issue at hand, MRP-139 requires bare metal visual examination of the nozzle to safe end welds of both the inlet and outlet of the RPV during 3R12 in Fall 2008. These are mandatory requirements under NEI 03-08. However in view of the almost 30 Rem dose impact of the inspections, ALARA principles compel an alternative approach unless the examinations provide an essential increment of assurance and safety that cannot be otherwise obtained. As a result, MPS3 has developed a justification for waiving the visual examinations while concurrently increasing volumetric inspection frequency, thereby achieving the same objective and intent of the original MRP-139 requirement.

The basis and intent of the visual examination requirements in MRP-139 are discussed in Section 6.10 and 6.11 for examination categories J and K respectively. Section 6.10.3 states "Visual examination capable of detecting any leakage must be performed in lieu of UT inspections." Section 6.11.3 has a similar statement for category K welds. Visual examinations are required only when UT examinations are not performed. Therefore the intent of the examination is to detect leakage, as a supplement to the primary strategy of relying on volumetric examinations to confirm the absence of initiated flaws. In effect, the visual examinations address any uncertainties regarding the possibility of not detecting existing flaws and of crack growth rates for the PWSCC mechanism. The approach of this deviation is that such uncertainties may equivalently be addressed by a higher inspection frequency for the volumetric examinations.

Therefore, in lieu of the required visual examination schedule MPS3 plans to rely on volumetric examinations that will be performed on a schedule consistent with the results of a flaw tolerance evaluation. A table of the inspection plan is provided below and is justified in the following text.

Table 2 - Comparison of MRP-139 and MPS3 Inspection Plan

	Hot Leg (Outlet)		Cold Leg (Inlet)	
	MRP Requirements Tbl 6-1 Cat. D and Tbl 6-2 Cat. J	Next and subsequent inspections	MRP Requirements Tbl 6-1 Cat. E and Tbl 6-2 Cat. K	Next and subsequent inspections
Volumetric (UT)	Every 5 yrs	3R13, Spring 10 and every other RFO (every 3 yrs)	Every 6 yrs	3R14, Fall 12 and every third RFO (every 4.5 yrs)
Bare Metal Visual Examination (VE)	Every RFO except ones with Volumetric	Not required	Within 3 RFO (4.5 yrs) of volumetric exam	Not required

As shown in the above table, the planned volumetric (UT) inspection schedule is at a greater frequency than the generic requirement of MRP-139, compensating for the lack of visual examinations in intervening outages. This schedule will be followed until revised due to mitigation of the affected welds or being superseded by regulatory action. The basis for this schedule is documented in the flaw tolerance evaluation performed by Westinghouse [4] and included as attachment 3 to this TE. The Westinghouse evaluation is discussed below.

The flaw tolerance evaluation postulates an initial flaw and projects its subsequent growth in the interval between examinations based on accepted flaw growth correlations and the limits of flaw stability identified in ASME Section XI IWB-3640. The 1989 Edition [7] is the basis for the current ISI program at MPS3, while the 1998 Edition [8], which is approved by the NRC, is used for the flaw tolerance evaluation. The acceptability of a flaw tolerance evaluation as a basis for an alternative to the MRP-139 inspection schedule is based on the example of Section XI Appendix L acceptance of flaw tolerance for actual flaws, and its prior use in similar deviation reports submitted to the MRP.

The initial flaw assumption for the flaw tolerance evaluation relies on having performed a recent volumetric examination, with no recordable indications, performed in accordance with qualified

UT techniques and techniques that meet MRP-139 Section 5.1.5 coverage requirements. In the 3R11 examinations there were no exceptions to coverage requirements, and none are expected in the future. Based on the clean examination results with no detected flaws, a postulated initial circumferential flaw with 10% through-wall depth and limited length is assumed. The axial flaw length assumed is governed by the width of the weld. The assumed stress field with no major repairs was assumed based on the lack of such repairs for MPS3, as discussed in Section 3.4 of this TE. The flaw growth correlation used is referenced to NUREG/CR-6964 and is consistent with the MRP-139 recommendation in Section 2.6.2 for A182 materials. The uprated reactor power RCS temperatures are conservatively used in the flaw growth analysis.

The results of the flaw tolerance evaluation are summarized in the flaw growth limit curves contained in Attachment 3. Figure 3-1 shows that the axial flaw growth governs for the inlet (cold leg) nozzle but is not limiting for long periods up to 72 months. For conservatism and to limit the deviation from MRP-139, a limit of 54 months (4.5 years) inspection interval is specified. For the outlet nozzle (hot leg) the circumferential flaw governs and the higher temperature reduces the allowable inspection interval to less than 46 months. For conservatism a 36 month (3.0 years) inspection interval is specified for this nozzle.

In summary, the plant specific flaw tolerance analysis shows with reasonable margin that the selected inspection frequencies for the inlet and outlet nozzles will ensure that an initiating flaw will not propagate to the extent that IWB-3640 limits are exceeded. In addition, it shows even greater margin against propagation to pressure boundary leakage. It is only this through-wall condition that is detectable by bare metal visual examination. Therefore, an alternative that waives visual examinations for times prior to challenging IWB-3640 limits does not introduce any significant increment of risk, while allowing a nearly 30 Rem reduction in personnel exposure. It is thus a justified deviation to MRP-139 requirements.

As a final remark, this evaluation and notification does not meet the usual MRP expectation regarding timeliness of notification. However the original examination plan for 3R12 had been developed under the assumption that the NRC would soon issue a revision to 10CFR 50.55a requiring inspections in accordance with ASME Code Case N-722, plus additional stipulations that would accompany the rulemaking. Since the mandated Code Case would have overriding effect on MRP-139, a relief request was prepared in anticipation of this new rule, and no deviation would be required per MRP-139 Section 5.1.7. However, the NRC issuance of the rule change was delayed beyond its original scheduled date such that there is no assurance that review of the proposed relief request would be completed prior to the Fall 2008 outage. Therefore the plan to seek a relief request was modified to instead develop the justification for a deviation from the MRP-139 mandatory visual examination requirements and provide a deviation report to the MRP in accordance with NEI 03-08 Addendum E. The late notification to the MRP is therefore unavoidable.

4.0 SAFETY-SIGNIFICANCE

This technical evaluation performs an evaluation only and does not implement any change. Since there is no required change to the Technical Specifications, there is no change to the facility, there is no change to a procedure, and there is no test involved with this technical evaluation, no 50.59 screen is required.

5.0 CONCLUSION

Based on the discussions and information presented, the following is concluded.

- Visual examination of the MPS3 vessel nozzle welds would entail nearly 30 Rem dose impact to personnel and could be avoided by a justified deviation to MRP-139
- Elimination of visual examinations are compensated by an increased frequency of volumetric examinations
- A plant specific flaw tolerance evaluation demonstrates that maximum flaw growth during the period between volumetric inspections will remain with ASME Code limits
- The objective and intent of MRP-139 visual inspection requirements for the nozzles are satisfied by the alternative volumetric inspection plan

Therefore this deviation from the mandatory visual examination requirements is justified for the MPS3 RPV nozzle welds.

6.0 ATTACHMENTS

1. Independent Reviewer's Comment Sheet (1 page)
2. Sketch of RPV Nozzle Insulation Package Design (1 page)
3. Flaw tolerance evaluation LTR-PAFM-08-127 Rev. 2 (Westinghouse non-proprietary) (19 pages)
4. Independent materials expert concurrence opinion letter (6 pages)

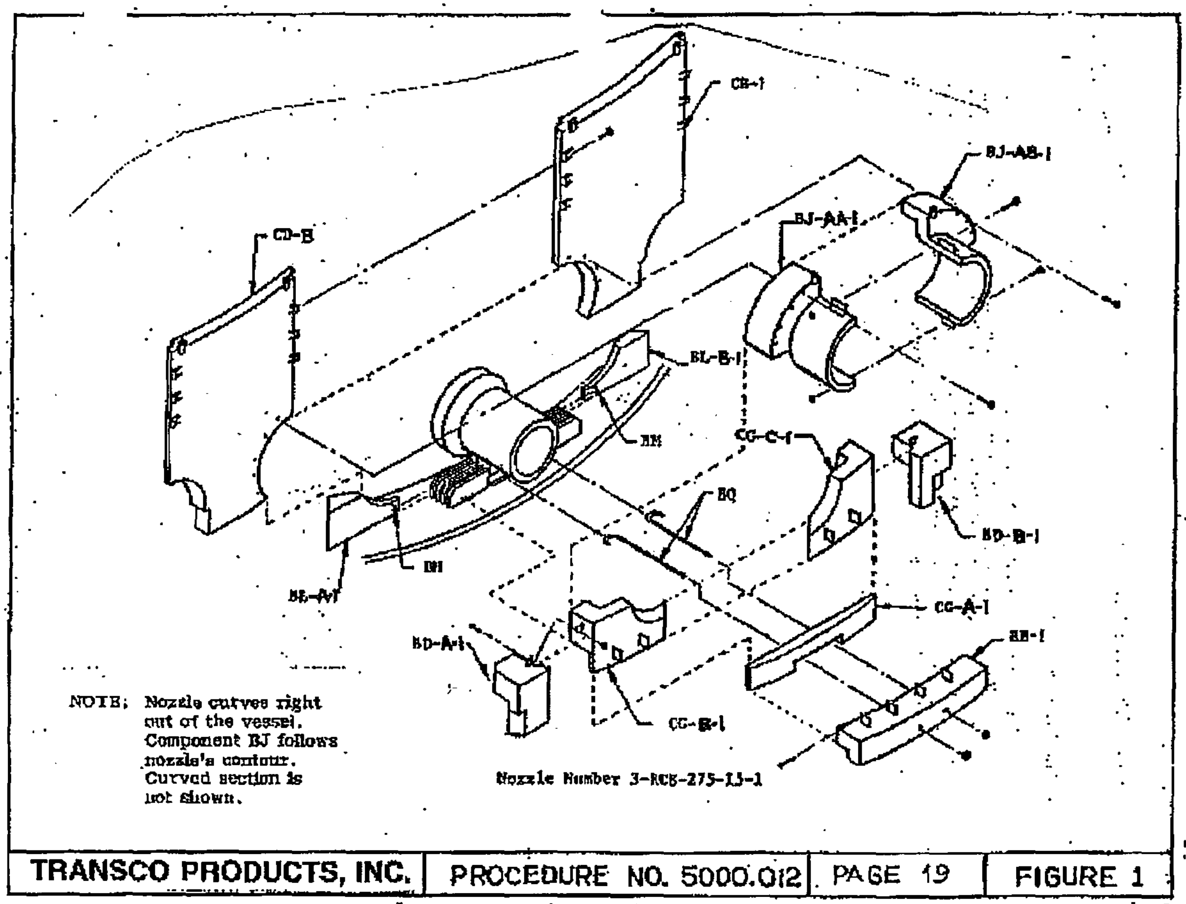
Independent Reviewer Comment and Resolution Sheet(s)

(ER/EV) No. M3-EV-05-0016 Rev. 0

Page 9 of 10

Independent Reviewer: Robert Schonenberg Date

Comment No.	ER/EV Section	Comment
1	Miscellaneous clarifications	Comments incorporated R. Y. Schonenberg 9/26/2008


CD-B
BJ-AB-1
BJ-AA-1
BL-B-1
BM
CG-C-1
BQ
BD-B-1
BH
CG-A-1
BB-1
BD-A-1
CG-B-1
NOTE: Nozzle curves right out of the vessel. Component BJ follows nozzle's contour. Curved section is not shown.
Nozzle Number 3-RCS-275-13-1
TRANSCO PRODUCTS, INC.
PROCEDURE NO. 5000.012
PAGE 19
FIGURE 1

Reference 4 -- Flaw Tolerance Evaluation

(19 pages follow)

LTR-PAFM-08-127 Revision 2

Technical Justification for Deviation from MRP-139 Visual Inspection Schedules for Millstone Unit 3 Reactor Vessel Inlet and Outlet Nozzles

September 2008

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Approved: S. A. Swamy*, Manager, Piping Analysis and Fracture Mechanics

Electronically approved records are authenticated in the electronic document management system.

Westinghouse

Revision Record

Revision	Date	Description
0	August 2008	Original Issue
1	September 2008	Incorporate third party review comment by revising the technical justification for the assumed circumferential flaw aspect ratio in Section 2.3
2	September 2008	Incorporate Westinghouse comment on the third party review comment by revising the technical justification for the assumed circumferential flaw aspect ratio in Section 2.3 with concurrence from Dominion.

1.0 Introduction

Recent field experiences and the potential for Primary Water Stress Corrosion Cracking (PWSCC) at the Alloy 82/182 dissimilar metal (DM) butt welds require reassessment of the examination frequency and the overall examination strategy for these butt welds. MRP-139 (Reference 1) provided the inspection and evaluation guidelines for the primary system piping dissimilar metal butt welds. Millstone Unit 3 had performed a volumetric and 100% surface examination of the reactor vessel inlet and outlet nozzle to safe end dissimilar metal butt welds during the Spring 2007 outage and no indications were detected. For the butt welds at the outlet nozzles, since they are being exposed to the hot leg temperatures, are not made of PWSCC resistant material and also have not been mitigated, visual inspection is required per MRP-139 in every outage when volumetric examinations are not being performed, until these butt welds are replaced or mitigated. A less frequent visual inspection schedule is required for the inlet nozzles per MRP-139 due to the lower normal operating temperature at these nozzles.

Flaw tolerance analyses have been performed for the Millstone Unit 3 reactor vessel inlet and outlet nozzle DM welds in order to provide technical justification for deviating from the MRP-139 visual inspection requirements, by not performing visual inspection of the reactor vessel inlet and outlet nozzle butt welds for at least two operating cycles (36 months). The following provides a discussion of the methodology, results and conclusion of the flaw tolerance analysis for both nozzles.

2.0 Methodology

2.1 Maximum End-of-Evaluation Period Flaw Size

The maximum end-of-evaluation period flaw sizes for axial and circumferential inside surface flaws at the Alloy 82/182 welds of the inlet and outlet nozzle are determined using the IWB-3640 evaluation procedure and acceptance criteria in the ASME Section XI Code (Reference 2) including the use of Z-factor for flux welds. The nozzle geometry (Reference 3) for the reactor vessel nozzles is shown in Table 2-1. The piping reaction loads from various loading conditions that are used in determining the most limiting end-of-evaluation period flaw sizes are summarized in Appendix A and taken from References 3, 4, and 5.

Table 2-1

Millstone Unit 3 Reactor Nozzle Geometry and Operating Parameters (Reference 3)

	Inlet Nozzle	Outlet Nozzle
Outside Diameter (in)	32 $^{15}/_{32}$	34 $^{7}/_{32}$
Inside Diameter (in)	27 $^{15}/_{32}$	28 $^{31}/_{32}$
Thickness (in)	2.500	2.625
Normal Operating Temperature (°F)	556.4	622.6

2.2 PWSCC Crack Growth Analysis

The Millstone Unit 3 reactor vessel inlet and outlet nozzle to safe end dissimilar metal weld regions are made of nickel based alloys. This nickel based alloy material (Alloy 82/182) is susceptible to PWSCC crack growth mechanism. The PWSCC crack growth rate used in the crack growth analysis is based on the EPRI recommended crack growth curves for Alloy 182 material (Reference 6) and shown below.

$$\frac{da}{dt} = \exp\left(-\frac{Q_g}{R}(1/T - 1/T_{ref})\right)\alpha(K)^\beta$$

where:

$\frac{da}{dt}$	=	Crack growth rate in m/sec
Q_g	=	Thermal activation energy for crack growth =130 kJ/mole (31.0 kcal/mole)
R	=	Universal gas constant = 8.314 x 10^{-3} kJ/mole-K (1.103 x 10^{-3} kcal/mole-°R)
T	=	Absolute operating temperature at the location of crack (K or °R)
T_{ref}	=	Absolute reference temperature used to normalize data = 598.15 K (1076.67°R)
α	=	Crack growth amplitude = 1.50 x 10^{-12} at 325°C (617°F)
β	=	Exponent = 1.6
K	=	Crack tip stress intensity factor (MPa$\sqrt{m}$)

It should be noted that the PWSCC crack growth mechanism is applicable only to the inside surface flaws since they are exposed to the primary water environment. The stresses used for PWSCC evaluations included normal operating condition piping reaction loads, pressure, and residual stresses at the DM welds. The normal operating temperatures for the inlet and outlet nozzles are 556.4°F and 622.6°F respectively,

The impact of fatigue crack growth mechanism is considered in the flaw tolerance analysis. Fatigue crack growth is negligible, especially for short plant operation duration (2 to 3 refueling cycles) when compared to that due to PWSCC because the locations of interest at the inlet and outlet nozzles are not subjected to any significant thermal transient loadings.

The residual stresses considered in the analyses were based on the reactor vessel nozzle residual stress profiles from Reference 7 for the case with no inside surface weld repair. This is acceptable since a review of all the available manufacturing records for the reactor vessel did not show any significant inside surface weld repairs made to either the inlet or outlet nozzle dissimilar metal welds (Reference 8).

Using the applicable stresses at the DM welds, the crack tip stress intensity factors can be determined based on the stress intensity factor expressions from References 9 and 10. The through-wall stress distribution profile is represented by a cubic polynomial:

$$\sigma(x) = A_0 + A_1 x + A_2 x^2 + A_3 x^3$$

where:

A_0, A_1, A_2, and A_3 are the stress profile curve fitting coefficients,

x is the distance from the wall surface where the crack initiates, and

σ is the stress perpendicular to the plane of the crack.

The stress intensity factor calculations for semi-elliptical inside surface flaws with various aspect ratios (flaw length/depth) for axial and circumferential flaws are performed. The influence coefficient at any points on the crack front can be obtained by using an interpolation method. The crack tip stress intensity factors can be expressed in the general form as follows:

$$K_I = \left(\frac{\pi a}{Q}\right)^{0.5} \sum_{j=0}^{3} G_j(a/c, a/t, t/R, \Phi)\, A_j a^j$$

where:

a: Crack Depth

c: Half Crack Length Along Surface

t: Thickness of Cylinder

R: Inside Radius

Φ : Angular Position of a Point on the Crack Front

G_j: G_j is influence coefficient for j^{th} stress distribution on crack surface (i.e., G_0, G_1, G_2, G_3).

Q: The shape factor of an elliptical crack, which is the square of the complete elliptical integral of the second kind or

Shape Factor $= [\int_0^{\pi/2} (\cos^2\Phi + \frac{a^2}{c^2}\sin^2\Phi)^{1/2}\, d\Phi]^2$. Q is approximated by:

$Q = 1 + 1.464(a/c)^{1.65}$ for $a/c \leq 1$ or $Q = 1 + 1.464(c/a)^{1.65}$ for $a/c > 1$.

Once the crack tip stress intensity factors are determined, PWSCC crack growth calculations can be performed using the crack growth rate discussed in Section 2.2 for the applicable normal operating temperature.

2.3 Maximum Undetected Flaw size

The initial flaw size used in the flaw tolerance analysis is assumed to be the maximum undetected flaw size since no indications were detected during the Spring 2007 volumetric and surface examination. The maximum undetected flaw depth is assumed to be 10% of the wall thickness. This assumed flaw depth is similar to the in-service inspection acceptance criteria in Table IWB-3514-2 of the ASME Section XI Code for returning components into service and therefore is a conservative and reasonable assumption. An aspect ratio (flaw length/depth) of 2 is assumed for the axial flaw since PWSCC is limited to the width of the A82/182 weld. For the circumferential flaw, an aspect ratio (AR) of 6 is assumed. As for the circumferential flaw, an initial flaw depth of 0.25 inch (10% through wall) and initial flaw length of 1.5 inches (aspect ratio of 6) is conservatively assumed for the inlet nozzle. Assuming the same aspect ratio for the outlet nozzle, the initial flaw length is assumed to be 1.58 inch. Since no detectable flaws were found in the dissimilar metal welds of these nozzles during the spring 2007 volumetric examination, it is considered highly unlikely, with a qualified volumetric examination, a flaw of this size would go undetected.

3.0 Flaw Tolerance Analysis Results

Figures 3-1 to 3-4 display the maximum allowable initial flaw size for the axial and circumferential flaws at the nozzle to safe end Alloy 82/182 welds for the Inlet and Outlet nozzles based on the IWB-3640 acceptance criteria. The horizontal axis displays the flaw depth to length ratio or the inverse of the flaw aspect ratio. The vertical axis shows the flaw depth to wall thickness ratio (a/t). The flaw evaluation chart displays allowable flaw size curves for plant operation duration up to 54 months. If the flaw parameters of a given flaw fall below the allowable flaw size curve for a given plant operation duration, then the flaw will not grow to the maximum end-of-evaluation period allowable flaw size within that plant operation duration. For comparison purposes, the maximum undetected

flaw size as discussed in Section 2.3 is also shown in Figures 3-1 to 3-4 to show the available margins for this assumed initial flaw size.
Figures 3-5 to 3-8 display the maximum allowable initial flaw size for the axial and circumferential flaws at the nozzle to safe end Alloy 82/182 welds for the Inlet and Outlet nozzles based on leakage instead of limit load failure. Leakage is assumed to occur once the initial inside surface flaw becomes a 100% through-wall flaw. If the flaw parameters of a given flaw fall below the allowable flaw size curve for a given plant operation duration, then the flaw will not grow to a 100% through-wall flaw within that plant operation duration. For comparison purposes, the maximum undetected flaw size as discussed in Section 2.3 is also shown in Figures 3-5 to 3-8 to show the available margins for this assumed initial flaw. The margins shown are slightly larger than those based on the IWB-3640 acceptance criteria.

As shown in Figures 3-3 and 3-4, the flaw tolerance result for the outlet nozzle is more limiting and continued plant operation duration of only 36 months is acceptable for the assumed undetected flaw size. There is adequate margin for the inlet nozzle (Figures 3-1 and 3-2) for continued plant operation duration of 54 months. Additionally, this margin is demonstrated by the 72 month curves identified in the inlet nozzle flaw tolerance charts. Since no indications were detected during the Spring 2007 refueling outage, crack growth due to PWSCC for the maximum undetected flaw size would not reach the end-of-evaluation period allowable flaw size per IWB-3640 or result in leakage for continued plant operation of at least 36 months for the reactor vessel inlet and outlet nozzles.

PWSCC crack growth curves for the limiting reactor vessel outlet nozzles are shown in Figures 3-9 to 3-10 for axial (AR=2) and circumferential flaw (AR=6) respectively with the initial flaw size equals to the assumed maximum undetectable flaw size. The horizontal axis displays the service life in effective full power months (EFPM), while the vertical axis shows the flaw depth to wall thickness ratio (a/t). These curves demonstrated the service life required to reach the IWB-3640 acceptable flaw size and a 100% through-wall flaw. Based on the IWB-3640 end-of-evaluation period allowable flaw size, it would take at least 48 EFPM for an axial flaw (AR=2), with an initial flaw depth of a/t=0.10, to reach the end-of-evaluation period allowable flaw depth. For a circumferential flaw (AR=6) with the same initial flaw depth, it would take 46.2 EFPM to reach the end-of evaluation period allowable flaw depth. The service life required is therefore more than 2 operating cycles (36 months) at Millstone Unit 3. Also as illustrated in Figures 3-9 and 3-10, the service life required to reach 100% through-wall thickness is slightly longer.

Figure 3-1

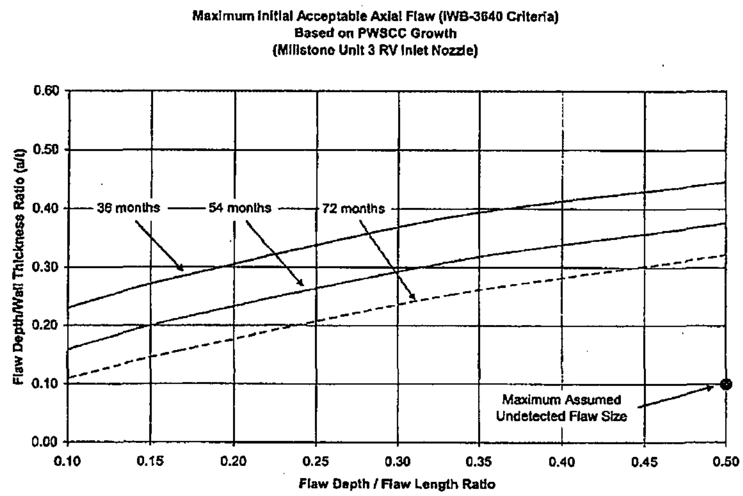


Figure 3-2

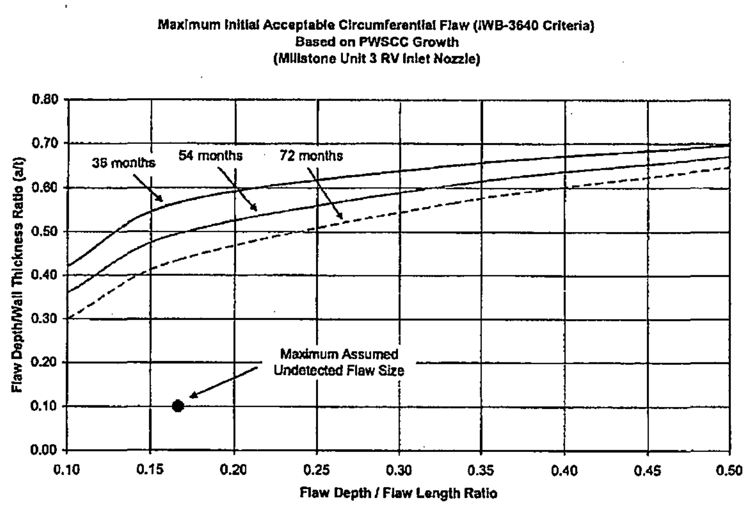


Figure 3-3

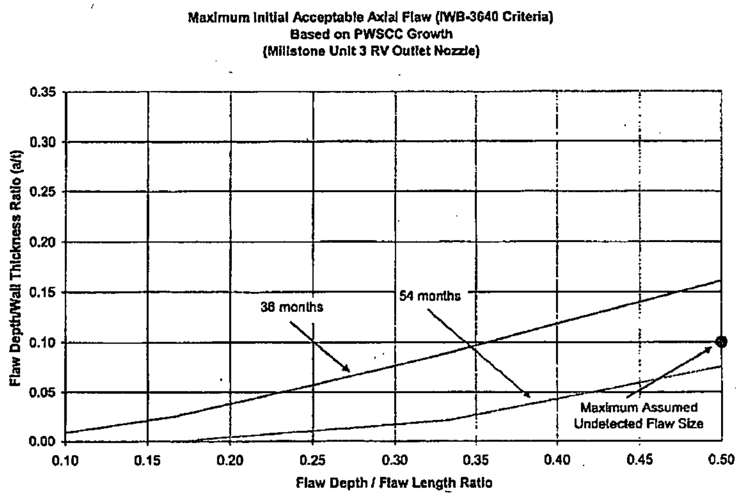


Figure 3-4

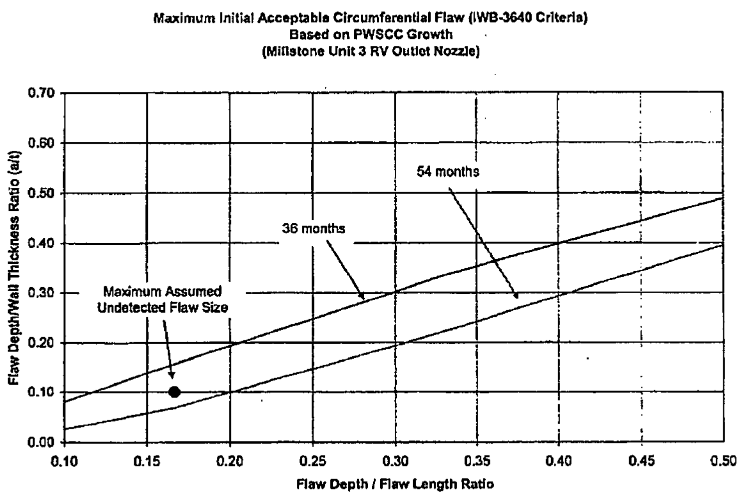


Figure 3-5

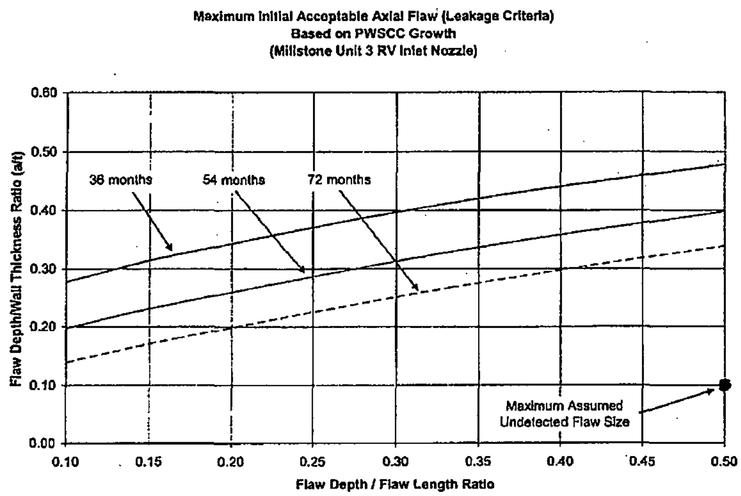


Figure 3-6

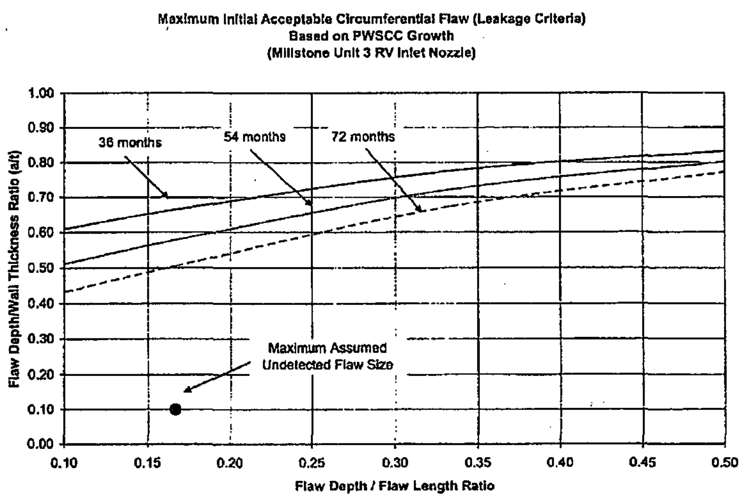


Figure 3-7

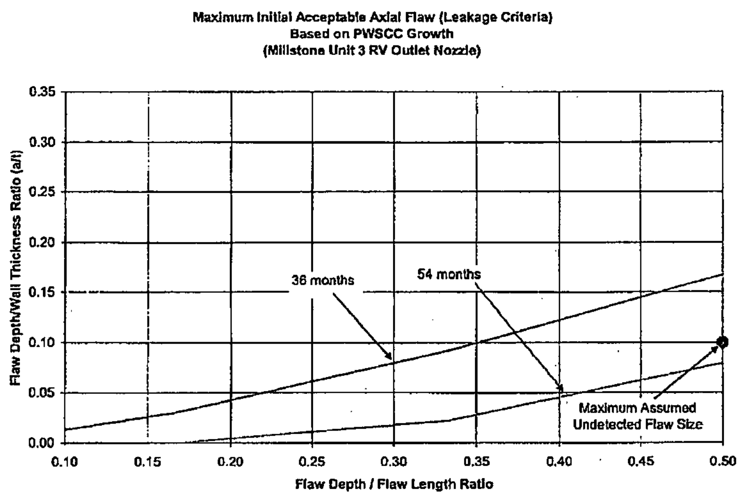


Figure 3-8

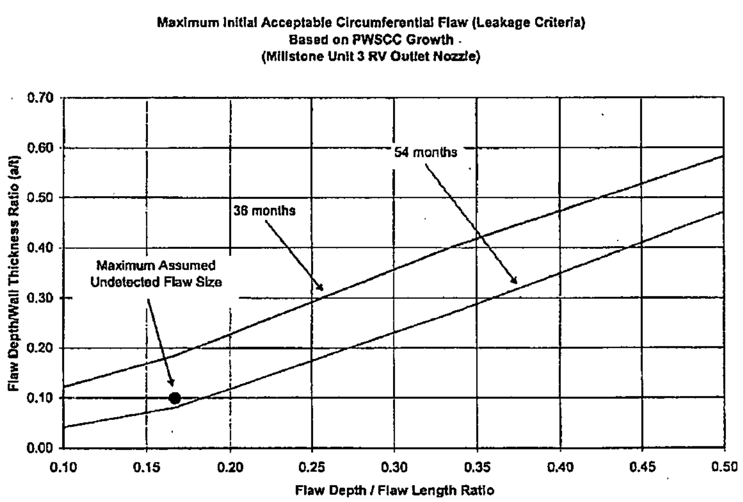


Figure 3-9

PWSCC Axial Crack Growth Curves for Outlet Nozzle Alloy 82/182 Weld Region

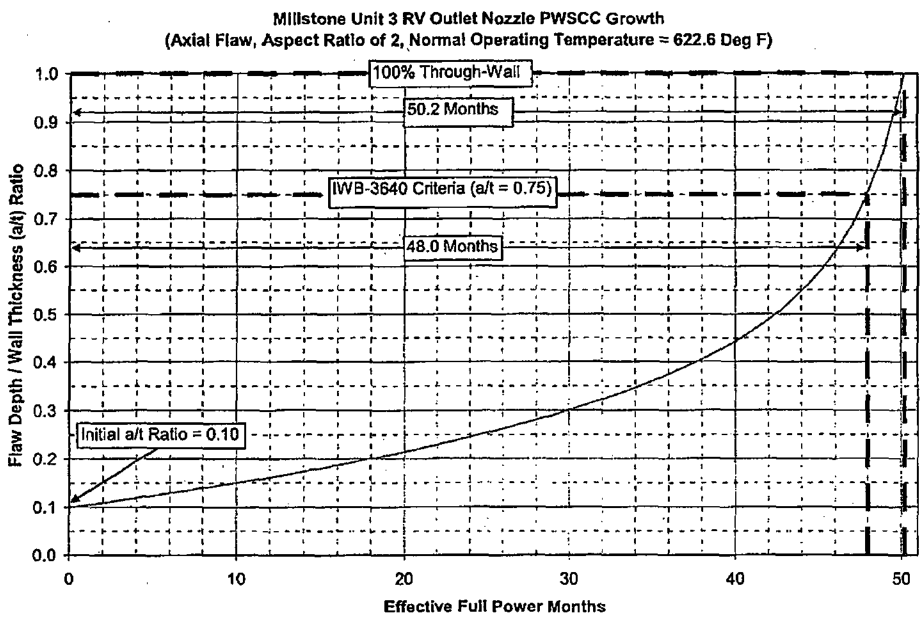
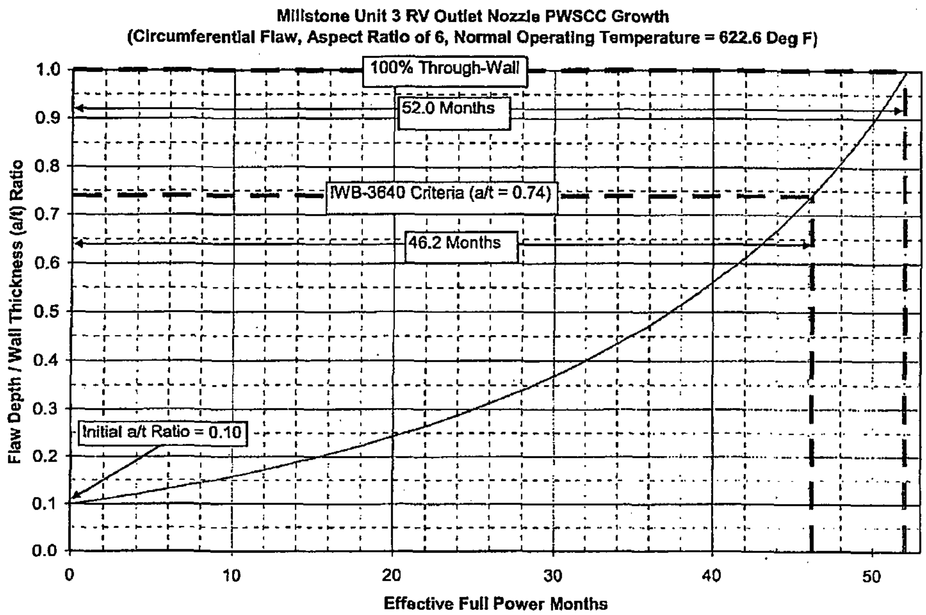


Figure 3-10

PWSCC Circumferential Crack Growth Curves for Outlet Nozzle Alloy 82/182 Weld Region



4.0 Discussion and Conclusion

The required visual inspection schedules for the inlet and outlet nozzles are shown in Table 6-2 of MRP-139. For the outlet nozzle, visual inspection is required in every outage when volumetric examinations are not being performed until the nozzle is being mitigated or replaced. The required volumetric examination for the outlet nozzle is every 5 years per Table 6-1 of EPRI Report MRP-139. Based on the MRP-139 volumetric examination schedule, the Millstone Unit 3 outlet nozzle would perform volumetric inspection every 3 refueling cycles since the refueling cycle interval for Millstone Unit 3 is 18 months. Based on the flaw tolerance results shown in Figures 3-3 and 3-4, it is acceptable to deviate from the MRP-139 visual inspection schedule by performing a visual inspection every other refueling outage when volumetric examinations are not being performed instead of every outage.

For the inlet nozzle, visual inspection is required once every three refueling cycles until the nozzle is being mitigated or replaced. The required volumetric examination for the inlet nozzle is every 6 years per Table 6-1 of EPRI Report MRP-139. Based on this volumetric examination schedule, the Millstone Unit 3 inlet nozzle would be inspected every four refueling outages. Per Table 6-2 of MRP-139, deterministic analysis can be used as a basis to allow the inlet nozzle DM welds to be visually examined at a frequency less than once every three refueling outages. Based on the flaw tolerance analysis performed, the results shown in Figures 3-1 and 3-2 demonstrated that there is adequate margin to support deviation from the MRP-139 visual inspection schedule for the inlet nozzle.

In summary, since no indications were detected during the Spring 2007 refueling outage, crack growth due to PWSCC for the maximum undetected flaw size would not reach the end-of-evaluation period allowable flaw size per IWB-3640 or result in leakage for continued plant operation duration of at least 36 months for the inlet and outlet nozzles. Based on the results of the flaw tolerance analysis, it is technically justified to seek a less frequent visual inspection schedule than those required in MRP-139 for both the reactor vessel inlet and outlet nozzle dissimilar metal weld regions.

5.0 References

1. Material Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guideline (MRP-139), EPRI, Palo Alto, CA: 2005. 1010087. (EPRI Proprietary Document)
2. Rules for Inservice Inspection of Nuclear Power Plant Components, ASME Boiler & Pressure Vessel Code, Section XI, 1998 Edition through 2000 Addenda.
3. Dominion Document 25212-ER-08-0024 dated 5/14/2008, "Reactor Vessel Nozzle Evaluation Input for NEU-08-29" (Dominion Proprietary Document)
4. Stone and Webster Engineering Corporation (SWEC) Document No. 12179-NP(B)-x7001A – "Pipe Stress Analysis: Reactor Coolant System Piping and Associated Branch Connections loops 1 and 3 ASME III Code Class 1 and 2" – Revision 0 – Boston, MA.
5. Stone and Webster Engineering Corporation (SWEC) Document No. 12179-NP(B)-x7002A – "Pipe Stress Analysis: Reactor Coolant System Piping and Associated Branch Connections loops 2 and 4 ASME III Code Class 1 and 2" – Revision 0 – Boston, MA.
6. NUREG/CR-6964 ANL-07/12, *Crack Growth Rates and Metallographic Examinations of Alloy 600 and Alloy 82/182 from Field Components and Laboratory Materials Tested in PWR Environments.*
7. Materials Reliability Program: Alloy 82/182 Pipe Butt Weld Safety Assessment for US PWR Plant Designs (MRP-113), EPRI, Palo Alto, CA: 2005. 1009549. (EPRI Proprietary Document)
8. Westinghouse Letter LTR-PCAM-07-21, "Millstone Unit 3 – PWROG PA-MSC-0233 – Task 2 Customer Deliverable – Primary Pressure Boundary Alloy 600/82/182 Fabrication Detail," February 23, 2007. (Westinghouse Proprietary Document)
9. Raju, I. S. and Newman, J. C., "Stress Intensity Factor Influence Coefficients for Internal and External Surface Cracks in Cylindrical Vessels," ASME Publication PVP. Volume 58, 1982, pp. 37-48.
10. Mettu, S. R., Raju, I. S., and Forman, R. G., NASA Lyndon B. Johnson Space Center report no. NASA-TM-111707, "Stress Intensity Factors for Part-through Surface Cracks in Hollow Cylinders," in Structures and Mechanics Division, July 1992.

Appendix A

Millstone Unit 3 Reactor Vessel Inlet and Outlet Nozzle Loads

Table A-1

Inlet Nozzle Loads – Table 1 of 3

	Loading	Reference	Forces (kips)	Moments (in-Kips)		
			Fx	Mx	My	Mz
Inlet Nozzle	Thermal	3, 4	+28 -35	0 -4905	+1621 -921	0 -8105
	Operating Pressure	3	1374	113	-316	-69
	Deadweight	3, 4	3	-401	1	-1108
	OBE Inertia	4	40	1354	2345	2526
	OBE SAM	4	39	71	112	181
	SSE Inertia	4	49	1350	2409	2356
	SSE SAM	4	61	108	177	274

Note: SAM = Seismic Anchor Motion

Table A-2

Inlet Nozzle Loads – Table 2 of 3

	Loading	Reference	Forces (kips)	Moments (in-Kips)		
			Fx	Mx	My	Mz
Inlet Nozzle	Thermal	3, 5	+34 -61	0 -4909	+1711 -1371	+7277 0
	Operating Pressure	3	1376	-305	533	-113
	Deadweight	3, 5	3	69	-37	-90
	OBE Inertia	5	42	1377	2150	2113
	OBE SAM	5	39	71	213	162
	SSE Inertia	5	53	1369	2189	1972
	SSE SAM	5	61	108	335	245

Note: SAM = Seismic Anchor Motion

Table A-3

Inlet Nozzle Loads – Table 3 of 3

	Loading	Reference	Forces (kips)	Moments (in-Kips)		
			Fx	Mx	My	Mz
Inlet Nozzle	Thermal	3, 5	+34 -61	0 -4909	+1711 -1371	+7277 0
	Operating Pressure	3	1376	-305	533	-113
	Deadweight	3, 5	3	69	-37	-90
	OBE Inertia	5	42	1377	2150	2113
	OBE SAM	5	39	71	213	162
	SSE Inertia	5	53	1369	2189	1972
	SSE SAM	5	61	108	335	245
	Break 9 – RHR	3	+245 -533	+913 -1132	+3909 -6865	+1705 -1003
	Break 10 - SI	3	+387 -500	+7756 0	+52699 -24678	0 -14413
	Break 11 - Surge	3	+74 -441	+927 -1101	+3630 -4790	+2164 -1436

Note: SAM = Seismic Anchor Motion

Table A-4

Outlet Nozzle Loads – Table 1 of 3

	Loading	Reference	Forces (kips)	Moments (in-Kips)		
			Fx	Mx	My	Mz
Outlet Nozzle	Thermal	3, 4	+35 -41	+43 -348	+3813 -2570	0 -13444
	Operating Pressure	3	1511	-27	341	-1095
	Deadweight	3, 4	2	29	-114	-728
	OBE Inertia	4	194	547	3813	3670
	OBE SAM	4	45	166	225	366
	SSE Inertia	4	254	630	3544	3351
	SSE SAM	4	71	251	358	554

Note: SAM = Seismic Anchor Motion

Table A-5

Outlet Nozzle Loads – Table 2 of 3

	Loading	Reference	Forces (kips)	Moments (in-Kips)		
			Fx	Mx	My	Mz
Outlet Nozzle	Thermal	3, 5	-27 +90	+738 0	+2071 -4889	0 +12545
	Operating Pressure	3	1509	70	-649	-237
	Deadweight	3, 5	0	-27	+50	-2550
	OBE Inertia	5	182	862	3488	3239
	OBE SAM	5	50	154	227	319
	SSE Inertia	5	236	965	3214	2956
	SSE SAM	5	80	234	360	483

Note: SAM = Seismic Anchor Motion

Table A-6

Outlet Nozzle Loads – Table 3 of 3

	Loading	Reference	Forces (kips)	Moments (in-Kips)		
			Fx	Mx	My	Mz
Outlet Nozzle	Thermal	3, 5	+90 -27	0 -738	+2071 -4889	+12545 0
	Operating Pressure	3	1509	70	-649	-237
	Deadweight	3, 5	0	-27	+50	-2550
	OBE Inertia	5	182	862	3488	3239
	OBE SAM	5	50	154	227	319
	SSE Inertia	5	236	965	3214	2956
	SSE SAM	5	80	234	360	483
	Break 9 – RHR	3	+803 -14	+3810 -3428	+34494 0	0 -48087
	Break 10 - SI	3	+492 -55	+1238 -1661	+2538 -4114	+5391 -5296
	Break 11 - Surge	3	+567 -274	+4086 -4250	+38733 0	+42348 0

Note: SAM = Seismic Anchor Motion

Independent Materials Expert Concurrence

W. McBrine, Altran Solutions

(5 pages follow)

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September 25, 2008
08-0419-L-001

Mr. Steven D. Janes
Dominion Nuclear Connecticut
Millstone Power Station
Rope Ferry Road (Route 156)
Waterford, CT 06385

SUBJECT: **Transmittal of Altran Design Verification Report 08-0419-VR-001, Rev. 0, "Third Party Review of the Technical Justification for Deviation from MRP-139 Visual Inspection Schedule, Millstone Point Unit 3"**

REF: Dominion Purchase Order 70187510, dated 9/11/2008.

Dear Mr. Janes:

Please find enclosed the original copy of Altran Design Verification Report 08-0419-VR-001, Rev. 0. This report documents the third party review that Altran performed on Dominion Nuclear Connecticut Technical Evaluation M3-EV-08-0018, Rev. 0, "Technical Evaluation for Technical Justification for Deviation from Mandatory Requirements of MRP-139, Millstone Unit Three."

Altran appreciates the opportunity to be of service to Dominion Nuclear. If you have any questions or comments, please do not hesitate to call Bill McBrine at (617) 204-1000.

Very truly yours,
ALTRAN CORPORATION

Alfred W. Chock, Jr.
Technical Lead – Mechanical Engineering

William J. McBrine
Technical Manager – Materials Engineering

Enclosure

ALTRAN

VERIFICATION REPORT

VR No.: 08-0419-VR-001 Project No. 08-0419 Page 1 of 4

Design, Analysis, Test, or Examination Verified: <n/a>

Document Verified:

Dominion Nuclear Connecticut Technical Evaluation M3-EV-08-0018, Rev. 0, "Technical Evaluation for Technical Justification for Deviation from Mandatory Requirements of MRP-139, Millstone Unit Three."

Method of Verification:

_x_ Independent Review ___Alternate Calculation ___Testing Qualification

Summary of Verification

At the request of Dominion Nuclear Connecticut, Altran Solutions Corporation performed a third-party review of a technical justification for deviation from the MRP-139 visual inspection schedules for Millstone Point Unit 3 (MP3) reactor vessel input and output nozzles. The results of this review are discussed in the following sections.

Documents Reviewed

1. Dominion Nuclear Connecticut, "Technical Evaluation for Technical Justification for Deviation from Mandatory Requirements of MRP-139, Millstone Unit Three". Tech. Eval. No. M3-EV-08-0018, Rev. 0, September, 2008.
2. Westinghouse Letter LTR-PAFM-08-127 (Non-Proprietary), "Technical Justification for Deviation from MRP-139 Visual Inspection Schedules for Millstone Unit 3 Reactor Vessel Inlet and Outlet Nozzles", Rev. 2, September, 2008.

Background

Recent field experiences and the potential for Primary Water Stress Corrosion Cracking (PWSCC) at the Alloy 82/182 dissimilar metal (DM) butt welds require reassessment of the examination frequency and the overall examination strategy for these butt welds. EPRI MRP-139 provides the inspection and evaluation guidelines for the primary system piping dissimilar metal butt welds. For butt welds at the outlet nozzles, that are exposed to hot leg temperatures, are not made of PWSCC resistant material and also have not been mitigated, MRP-139 requires visual inspection is required at every outage when volumetric examinations are not being performed, until these welds are replaced or mitigated. A less frequent visual inspection schedule is required for the inlet nozzles per MRP-139 due to the lower normal operating temperature at these nozzles.

MP3 performed a volumetric examination of the reactor vessel inlet and outlet nozzle to safe end dissimilar metal butt welds during the Spring 2007 outage. At that time, no indications were detected. To provide relief from the MRP-139 visual inspection schedule requirements, Westinghouse performed a flaw tolerance analysis (see Document 1) of the MP3 RV inlet and outlet nozzle DM welds. This analysis demonstrated that the next visual inspection of the reactor vessel inlet and outlet nozzle butt welds would not be necessary for at least two operating cycles (36 months).

Technical Approach

Altran's review of the two documents assessed the adequacy and presentation of the following:

- Criteria (i.e., applicability to the requirements of MRP-139)
- Methodology
- Selection of suitable input
- Tabulated results
- Conclusions of the evaluation.

Reference Documents

As part of the review process, the following documents were examined. These documents are either commercially available or comprise the design basis of Millstone Unit 3.

1. Electric Power Research Institute, *Material Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guideline (MRP-139)*, EPRI Report 1010087. (EPRI Proprietary Document). Palo Alto, CA: 2005.
2. American Society of Mechanical Engineers, "Rules for Inservice Inspection of Nuclear Power Plant Components", *ASME Boiler & Pressure Vessel Code*, Section XI, 1998 Edition through 2000 Addenda.
3. Argonne National Laboratory, *Crack Growth Rates and Metallographic Examinations of Alloy 600 and Alloy 82/182 from Field Components and Laboratory Materials Tested in PWR Environments*, NUREG/CR-6964. Argonne, IL: U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, 2008.
4. Nuclear Energy Institute, "Guidelines for the Management of Materials Issues", NEI 03-08, Rev. 1. Washington, DC: April 2007.
5. Electric Power Research Institute, *Material Reliability Program: Alloy 82/182 Pipe Butt Weld Safety Assesment for US PWR Plant Designs (MRP-113)*, EPRI Report 1007029. (EPRI Proprietary Document). Palo Alto, CA: 2004.

Conclusions

As a result of the review, Altran Solutions Corporation has made the following findings:

1. Altran concurs that the deviation set forth in Technical Evaluation M3-EV-08-0018 satisfies the objective and intent of MRP-139.
2. Altran further finds that the technical arguments in support of Technical Evaluation M3-EV-08 are satisfactory, and that they accurately incorporate the basis provided in Westinghouse Document LTR-PAFM-08-127.

Qualifications of Reviewers

The third-party review was conducted by William McBrine, PE, with contributions from Edmund Dunn, Sc.D. and Bahaa Elaidi, Ph.D. A short summary of team member qualifications is provided in Attachment A. Full professional resumes are available upon request.

Statement of Concurrence

Having performed a third-party review of Domnion Technical Evaluation M3-EV-08-0018, Rev. 0 in the role of Independent Materials Expert, Altran Solutions hereby states its concurrence with the technical evaluation and the results herein.

Mr. McBrine has affixed his endorsement as Independent Materials Expert to Millstone Technical Evaluation M3-EV-08-0018.

William J. McBrine, PE, Technical Lead — Date: 9/25/08

Bahaa A. Elaidi, Ph.D., Contributor — Date: 9/25/08

Edmund M. Dunn, Sc.D., Contributor — Date: 9/25/08

ATTACHMENT A
SUMMARY OF QUALIFICATIONS OF REVIEWERS

William J. McBrine, PE
Technical Lead

William McBrine is the Technical Manager of the Materials Engineering Group at Altran Solutions. Mr. McBrine has 30 years of experience in the nuclear power industry with particular expertise in addressing structural integrity issues. He has extensive experience in the assessment of degraded mechanical components, including failure analysis, flaw evaluations and remaining life prediction. He has led projects investigating Alloy 600 issues including the prediction of SCC crack growth rate and influencing factors. Mr. McBrine also has extensive experience in stress analysis, fracture mechanics and qualifications to ASME B&PV Sections III and XI requirements.

Bahaa A. Elaidi, Ph.D.

Dr. Elaidi is the Technical Manager of Structural Engineering and Engineering Mechanics at Altran Solutions. He has over 25 years of experience in applied mechanics, failure analysis, and root cause evaluation, with a diverse background in analysis, inspection, and repair of civil and mechanical systems and components. Previous applicable work includes investigation of cracking in steam generator tubes, establishment of critical flaw sizes welded joints of piping and spent fuel canisters, failure analyses and life assessment of nuclear plant components, and analytical modeling of flaws and crack growth.

Edmund M. Dunn, Sc.D.

Edmund M. Dunn has over 30 years of experience in Materials Science and Engineering with core expertise in solidification metallurgy, brazing and welding. His experience includes Bettis Atomic Power Laboratory, and GTE Laboratories. While at Bettis, his work included studies on factors affecting stress corrosion cracking and weld hot cracking in reactor plant materials (Ni-Cr-Fe Alloy 600).

He has served as chair of a national committee, the TMS/AIME Solidification Committee and is the author or coauthor of numerous papers and five patents. His work has included materials selection, market evaluation, process improvement, and failure analysis. He is a member of ASM and TMS/AMIE. He has been Secretary of ASM International Boston Chapter.

Dr. Dunn received an Sc.D. in Materials Science and Engineering from MIT, a B.S. in Materials Engineering from RPI, and an MBA from the University of California at Berkeley.

10 CFR 50.55a Request Number IR-3-11

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(ii)

--Hardship or Unusual Difficulty
without a Compensating Increase in Level of Quality or Safety--

1. ASME Code Components Affected

ASME Code Class:	Code Class 1
References:	ASME Section XI, Table IWB-2500-1 and IWB-5222
Examination Category:	B-P (All Pressure Retaining Components)
Item Number:	B15.10
Description:	Alternative Pressure Testing Requirements for the RPV Flange Leak-Off Piping
Components:	NPS 1 RPV Flange Seal Leak-Off Piping

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

IWB-2500, Table IWB-2500-1, Code Category B-P, Item Number B15.10 requires that all Class 1 pressure retaining components be Visual, VT-2 examined each refueling outage. The required system pressure test can be either a hydrostatic test or a system leakage test. The system leakage test is performed at a pressure not less than the pressure corresponding to 100% rated reactor power. Per IWB-5222(a), the pressure retaining boundary during the system leakage test shall correspond to the reactor coolant boundary, with all valves in the position required for normal reactor operation startup. The visual examination shall, however, extend to and include the second closed valve at the boundary extremity. Per IWB-5222(b), the pressure retaining boundary during the system leakage test conducted at or near the end of the interval shall extend to all Class 1 pressure retaining components within the system boundary.

4. Reason for Request

As discussed in 3, "Applicable Code Requirements," ASME Section XI, 2004 Edition (No Addenda) requires that Class 1 pressure boundary piping shall be pressure tested after each refueling outage. The Reactor Pressure Vessel (RPV) head flange seal leak detection piping is shown in Attachment 1. The piping is separated from the reactor coolant pressure boundary by one passive membrane, which is an o-ring located on the inner vessel flange. A second o-ring is located on the outside of the tap in the vessel flange. Failure of the inner o-ring is the only condition under which this line is pressurized. Therefore, the line is not expected to be pressurized during the system pressure test following a refueling outage.

The configuration of this piping precludes system pressure testing while the vessel head is removed because the configuration of the vessel tap coupled with the high test pressure prevents the tap in the flange from being temporarily plugged or connected to other piping. The opening in the flange is smooth walled, making the effectiveness of a temporary seal very limited. Failure of a temporary test seal could possibly cause ejection of the device used for plugging or connecting to the vessel flange.

The configuration also precludes pressurizing the line externally with the head installed. The top head of the vessel contains two grooves that hold the o-rings. The o-rings are held in place by a series of retainer clips that are housed in recessed cavities in the flange face. If a pressure test were to be performed with the head on, the inner o-ring would be pressurized in a direction opposite to its design function. This test pressure would result in a net inward force on the inner o-ring that would tend to push it into the recessed cavity that houses the retainer clips. The thin o-ring material would likely be damaged by the inward force.

Purposely failing or not installing the inner o-ring in order to perform a pressure test would require purchasing a new o-ring set and the time and radiation exposure associated with removing and reinstalling the RPV head to replace the o-rings would be an undue hardship.

Considering this information, compliance with the IWB-5222(b) system pressure test requirements results in unnecessary hardship without sufficient compensating increase in the level of quality and safety.

5. Proposed Alternative and Basis for Use

In lieu of the requirements of IWB-5222(b), a VT-2 visual examination will be performed each outage on the unpressurized subject piping as part of the Class 1 leakage test. If the inner o-ring should leak during the operating cycle it will be identified by an increase in temperature of the leak-off line above ambient temperature because this is an indication of o-ring seal leakage. This high temperature would actuate an alarm in the Control Room, which would be closely monitored by procedurally controlled operator actions allowing identification of any further compensatory actions required. This leakage would be collected in the primary drain transfer tank.

Additionally, the flange seal leak-off line is essentially a leakage collection/detection system and the line would only function as a Class 1 pressure boundary if the inner o-ring fails, thereby pressurizing the line. If any significant leakage does occur in the leak-off line piping itself during this time of pressurization then it would clearly exhibit boric acid accumulation and be discernable during the proposed VT-2 visual examination that will be performed unpressurized as proposed in this request.

6. Duration of Proposed Alternative

This relief is requested for the duration of the Third Inservice Inspection Interval, which begins on April 23, 2009, and is scheduled to end on April 22, 2019.

7. Precedents

North Anna Unit 1 Relief Request SPT-013, "Examination Category B-P Pressure Retaining Components in the Reactor Coolant System," approved by NRC letter dated February 9, 2006, ADAMS Accession No. ML060450517

Reactor Pressure Vessel Seal Leak-Off Details

DOMINION
Millstone 3

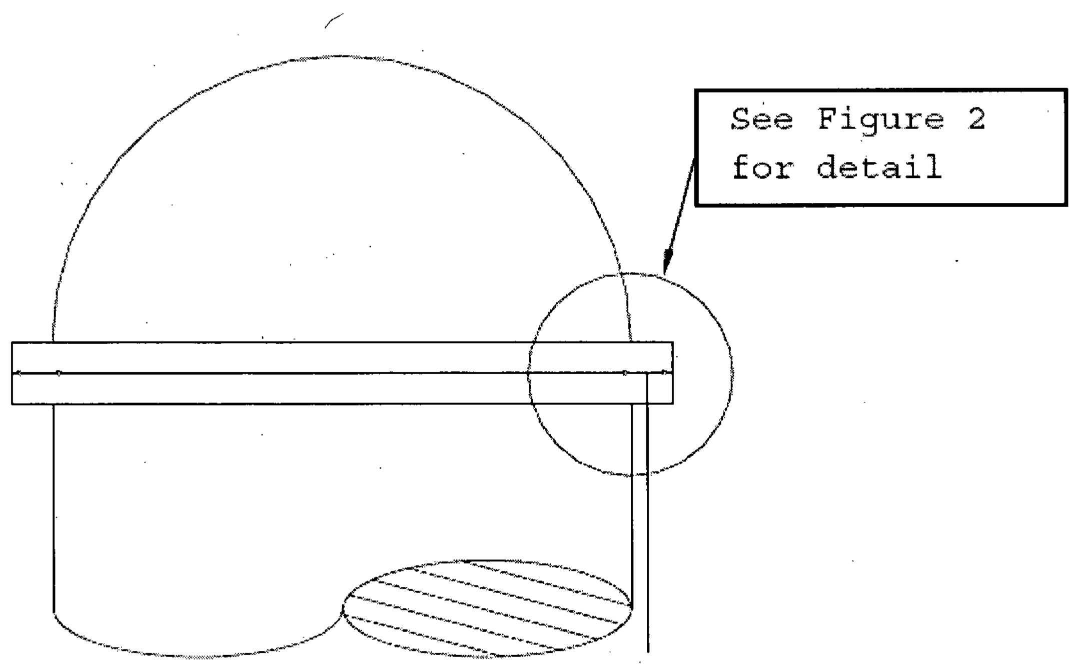

Figure 1:
REACTOR PRESSURE VESSEL HEAD FLANGE
LEAK-OFF LINE CONFIGURATION

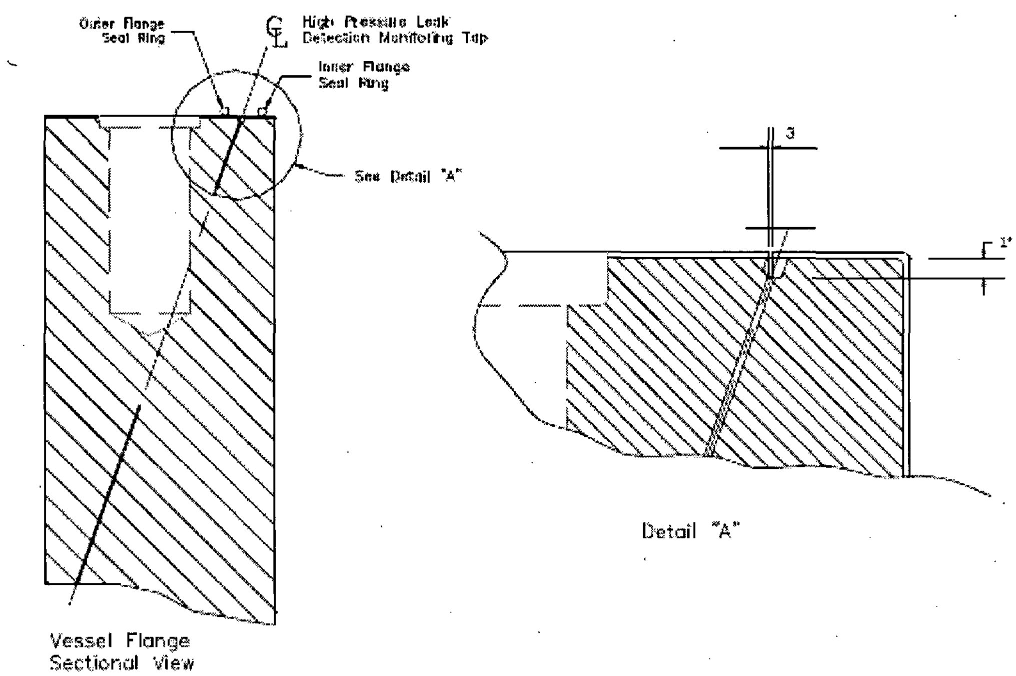

Figure 2
REACTOR PRESSURE VESSEL HEAD FLANGE
LEAK-OFF LINE DETAILS